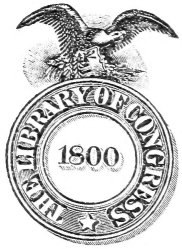


GROWING GOLD;

OR,

A TREATISE ON THE

CULTIVATION OF BRITISH OAK.

"How I love, in the Forest, to gaze on the OAK
Till a feeling of grandeur and might fills my soul,
And I thrill just as if a deep oracle spoke,
"Lo! the FATHER OF SHIPS that no foe can control!"

FEIST.

BY JAMES SAWYER.

LONDON:

SIMPKIN AND MARSHALL, STATIONERS' COURT;

AND

RIDGEWAY, PICCADILLY.

1838.

TO THE

RIGHT HONORABLE EARL SPENCER,

PRESIDENT OF THE

ENGLISH AGRICULTURAL ASSOCIATION;

AND TO ITS

DISTINGUISHED MEMBERS.

My Lords and Gentlemen,

As you have invited communications on the Cultivation of Timber, &c. I take the liberty of inscribing this little work to your society; and with every sentiment of profound respect,

I have the honor to be,

My Lords and Gentlemen,

Your most obedient, humble Servant,

JAMES SAWYER.

Newmarket
Cambridgeshire

ERRATUM.

Page 102, line 7, for "*growing timber,*" read "*setting out young trees.*"

INTRODUCTION.

"The aggrandizement and security of the powers of one's own country is the duty of every man,"* says the illustrious "Hero of a Hundred Fights." The possession of a large store of timber, and of trees growing to timber, on the British Isles, is unquestionably now, as heretofore, necessary to the nation to maintain its naval and commercial power, prosperity and security.

Russia and the United States possess vast power to annoy our timber trade, and to interpose the most serious obstacles to it in the Baltic and Gulf of St. Lawrence; and were such power to be exercised simultaneously, it is impossible to calculate the amount of inconvenience and mischief that would ensue. Believing the prevailing system of planting trees and managing timber to be erroneous, and likely ultimately

* Duke of Wellington's Despatches, end of Vol. 10.

to produce disastrous consequences to the community if no exertion be made to remedy the evil, I have considered it an imperative *duty* to volunteer my services. I am borne out in the opinion that something requires to be done, inasmuch as two societies of noblemen and gentlemen have solicited information on the subject; I therefore offer them and the public the result of my observations. If my suggestions are in accordance with the principles of nature, as I believe them to be, the community at large may be materially benefited by acting upon them.

It is necessary there should be extensive national plantations; because private estates are liable to many changes, both of owners and managers, whose various wants and whims render the fate of the crop of timber very precarious.

It would be adding a golden page to the record of the reign of our excellent Queen, if by Her Majesty's command an extensive provision of British oak were made for the future inhabitants of these islands.

Numerous publications on the growth of timber have issued from the press, but I have not yet found one that treats, with sufficient attention, on the manner in which trees grow spontaneously. Artificial systems have been propounded, "line upon line," but all investigations as to quality of timber have been strangely disregarded. Every part of the world has been searched, "from Indus to the Pole," and its various productions have been imported and cultivated, to rival the offspring of our own soil, although acknowledged by

all but the most hardened champions of their own interest, to be the best material to form the "buildings" which convey the wealth of commerce from every sea-port to our shores—the best material for the construction of ships which carry our avenging thunder to the home of threatening enemies, and are Britannia's bulwark against "a world in arms."

There is one planter, and only one whom I except from the general mass; and the records of the Royal Society corroborate my opinion. Had life been spared the illustrious and highly talented lady to whom I allude, most probably from the unwearied anxiety with which she sought after practical knowledge, further valuable communications upon the subject would have been made to the society, and other golden medals would have been awarded for them. Long—long will the name of the late DUCHESS OF RUTLAND shed a lustre on the records of that society.

A Northamptonshire correspondent to the Gardeners' Gazette complains of the state of the Crown lands; indeed several other publications have made similar statements, therefore I am not singular in the opinion I have given as to the management of the rural business of the office of woods and forests. I have made use of the name of Mr. Jesse,* as the representative of this department, and as a public servant, he having held the office of itinerant surveyor. When the importance

* I will own a curiosity to learn whether this is the same gentleman whose name appears in the Court Calendar for 1832, page 101, under the head of Ewry. The service is, I believe, to take care of the Royal table linen, lay the cloth, and serve up water in silver ewers after dinner.

of the subject to the community is duly considered, it will not only be an apology, but will justify the freedom I have used. The means are at hand to provide as much timber as ever can be wanted: all that is required is that they who have the power should have the skill to rear it. When the ease by which such an event can be accomplished is demonstrated, the House of Commons will doubtlessly insist upon the adoption of the necessary arrangements.

In works of this kind it is necessary to show some practical acquaintance with the subject: thirty years ago I assisted to set out land for plantations, and the crop of trees that are now growing there are of much more value than those in many plantations which were made by different planters at the same time, and are situated on more favorable soils. Ever since that period I have made woods and forests my particular study.

More than forty estates, in various parts of the kingdom, have been examined, and reports drawn up of the state of the timber and plantations on them. Those that I have mentioned in the following pages show the general state of things. Some of these estates are under the control of the office of woods and forests, the Universities, the Courts of Chancery, trustees of charities of various kinds, and others belong to noblemen and gentlemen: none of them show an adherence to the principles of nature by which the trees grew to maturity in the ancient woods and forests, therefore no profit could be expected. The losses sustained by the present system operate in so many ways it is difficult to compute the amount.

CHAPTER I.

If ever there was a period when attention to the cultivation of oak timber was imperiously demanded, it is the present; inasmuch as that which is now growing in our forests and woods, can bear no comparison with the produce in times gone by. The whims and fancies which have distinguished the planters and managers of timber, during the last hundred years, have sadly operated against the production of a store to supply any future deficiency. The number of acres reserved for the growth of wood in these kingdoms is considerable, and capable of producing an immense quantity of the best

quality. The general practice, however, has been, and still is, to grow pines, beech, birch, poplars, alder, sycamore, the Turkish and sessiliflora oaks, &c. and to allow small stunted oak trees to occupy the land with the underwood, instead of cultivating oak timber trees.

Owners appear to have paid no attention to this part of the subject, although it is certainly their interest to do so. It has been said that timber is only an excrescence to pay people's debts with, and no doubt many woods have been cut down for such purpose. Few writers appear to be fully aware of the importance of this subject, and the generality of managers appear by their works to be no better informed as to the rate timber increases in value, although Evelyn has given them broad hints respecting it, and has distinctly pointed out the cause which principally prevents its growth. He says, "to give an instance of what store of woods and timber of prodigious size there was growing in our little county of Surry (the

nearest of any to London) and plentifully furnished both for profit and pleasure, (with grief and reluctancy I speak it) my own grandfather had standing at Wotton, and about the estate, timber, that now were worth one hundred thousand pounds, since of what was left by my father (who was a great preserver of wood), there has been thirty thousand pounds worth of timber fallen by the axe and the fury of the late hurricane and storm : now no more Wotton, stript and naked, and ashamed almost to own its name."—*Sylva B.* 3. *C.* 7.

This is a clear recognition of the two great points which I now attempt to establish ; namely, the great importance of the subject, and the great injury to the timber by strong winds.

Mr. Jesse, a gentleman who holds the office of inspector of parks and palaces to the department of woods and forests, has published a work which he calls "Gleanings in Natural History," wherein he states the circumference

of a tree, of only seventy years old, to be twelve feet six inches; and he copies from the Selbourne Journal an account of a tree, the first fourteen feet of which contained more than one thousand feet of timber, it being thirty-four feet in circumference. And he also mentions that a tree, grown in Wales, and which squared two thousand four hundred and twenty-six feet, was sold, with all its parts, and realized nearly six hundred pounds. All three of them were of course oak trees. This corroborates Evelyn most fully, and justifies the importance which is attached to the subject in these pages. It is most remarkable that Mr. Jesse merely mentions these trees, and appears to pride himself on doing it, in as few words as possible, although there are many far less important incidents related in his three volumes, which might have been better omitted. The accumulation of so much vegetable matter in so short a time, as in the first of his trees, exhibits, not only an interesting fact in natural history, but also a very advantageous circumstance for the community to be aware of, there-

fore it is much to be regretted that he did not give a more extended account of them.

It is very questionable whether there are any means of obtaining so great a remuneration for capital without any risk, as by growing oak timber. The landowners of the last century, who annually planted a few acres, properly, with oak trees, might justly direct their heirs to "do likewise and live up to their rentals," for they and their posterity will always have a sinking fund to resort to when an event occurs to demand an extraordinary expenditure. The imitation of so good an example is to be accomplished by arrangements which require but little, if any cash, to be drawn from the pocket, or land to be taken from the rental, as I shall shortly prove.

From the extent of country that may be examined before a healthy and full growing oak tree can be found, of from thirty to one hundred years old, the presumption is, that many persons who now have the care and

management of large woods and plantations, have never seen one. This, although an extraordinary assertion, is, nevertheless, but too correct. When owners of this kind of property investigate the point, they will be ready to admit the truth of the statement. From the present condition of trees in general, no other inference can be drawn. I can confidently affirm that many large estates have been looked over two or three times each, and there has not been found a single healthy looking oak tree of any age growing at its full natural rate: if wood agents of such estates had seen some fullgrown specimen, it is but just to presume they would have copied the means by which it had been reared. The least stunted young oak trees that have been discovered, whose ages are correctly known, are under the care of a person who has also the management of some hundreds of acres of woods and plantations, in which none but stunted, mutilated, wind driven, dead topped, moss grown, diminutive trees are to be found. The blindness of this man is inexcuseable, because he

has precedents to guide him to a more profitable practice. Instances of twenty-five and fifty-five years' growth are invaluable, as they show increase enough to ensure a very large profit, and these exist on the very same estate; and what renders these two cases still more important, is, that the ages of the trees can be accurately stated, which is frequently a matter of some difficulty.

The privation of the knowledge of the growth of trees, by the present method of managing timber, and the slender hopes which the prospect affords of any extensive accumulation of property under it, will, it is to be hoped, stimulate landowners to adopt a different method. When they reflect upon the profit that would accrue from growing native trees, and how much more to their advantage it would be than buying foreign timber, they will not fail to be thankful for having had their attention directed to the subject. It is not to be expected that they who are intrusted with the management of such property will, all at

once, become converts to the author's opinion, and acknowledge themselves in error: indeed some have already manifested by their writings, that they are indignant at its being supposed possible they can be acting wrong. The inspector of parks and palaces writes with as much complacency as if all were perfection around him. If the commissioners at the head of his office do not point out to him the absurdity of wasting his time in talking with "mole and rat catchers," instead of employing it agreeably to the tenor of the trust reposed in him, wholly to the advantage of the public, it is hoped that some member of the House of Commons who may have occasion to notice the charges for foreign timber in the estimates, will move for an inquiry as to the cultivation of oak in the royal forests, &c. Is due attention paid to it or not? Is there not land which is now occupied by weeds and bushes only, capable of growing some millions of pounds worth of timber for the use of government? If the answer to this last question should show (and it assuredly will) that there is, then

if not profitably planted, WHY NOT? It is somewhat extraordinary that a subject of such transcendent importance should have hitherto escaped with so little inquiry; and yet it is not very surprising either when it is considered how many persons have been appointed to the management of timber albeit they have had no more fitness for the office than "babes in the wood."

Appointments could be named little less ridiculous than giving the command of an East India ship to a music master, who had never been afloat before. By such an arrangement, the destruction of the ship might be calculated upon with tolerable accuracy: the failure of the growing crop of materials for ship building is no less certain by the appointment of improper persons to manage it.

Pontey says, that "writing upon this subject is a thankless office, as owners of woods and plantations will not confess their need of any such instructor." The nobility and large landowners generally have persons to manage

this kind of property for them, and their liberality to those whom they thus employ, is a presumptive proof they wish it to be arranged in the best and most profitable manner. It is therefore but justice to them to assume they will gladly receive and countenance the advocate of any system that has a good title to their patronage. Such attacks come with a very ill grace from Pontey, who, as a planter, enjoyed a liberal share of the patronage of the highest ranks; the very parties whom he accuses of ingratitude. This leads to a suspicion that his claim to applause, as an author, is not quite tenable. By visiting, however (as I have done) the estates of some of his patrons, and by measuring a few trees of various kinds and stating the market price of each, it will be easily demonstrated to what amount of credit his published opinions are entitled. It appears that his favorite trees were white beech—the pine class and sessiliflora oak.

If government and landowners do not respond to the just claims of those who write on

this subject, it is not their fault; the blame rests with those to whom the questions are referred for examination. Few men act with so little regard to their private interests as to draw up reports which impeach the accuracy of their own practice, or to go to their employers and say, "I have managed your woods until you have not a sound oak tree in them; I admit large trees formerly grew there, but there is now no prospect of any growing again to a great size; and the plantations do not appear to increase in value; I recommend you to look out for some one to correct my system of managing woods and plantations." No man will condemn himself by voluntarily making these declarations. It is not the intention to attack either the honor or respectability of any person, but to demonstrate the just principle of our legal polity, that "no man can be a judge in his own cause;"—a maxim too frequently forgotten!

In the present case there are two parties, the managers of the woods and plantations

and the author. The owners of landed property, as growers and consumers, and all consumers of timber, are the judges. When any person is courageous enough to condemn a general practice, he is sure to encounter a large share of opposition, if not odium, from all who are concerned in that practice; but the gratification of being able to perform an important public duty; that of demonstrating the means by which the nation can be materially benefited, is a sufficient shield against the official spleen with which the author will, doubtless, be assailed.

A nation, whose boundary is the sea shore, must ever be a large consumer of timber for shipping, and the considerable rise of the price of which must be an additional tax to the country, on every extensive repair or increase of the royal navy, and also be an increasing charge upon every article exported and imported, in the shape of higher rate of tonage, for the conveyance of every kind of goods by our merchant vessels. Nay, the high price of

oak timber must materially impede the trade of ship building in these kingdoms, if not cause it to cease altogether. That this must happen at no very remote period is certain, unless the most zealous endeavours are made, not only by the nation, but by private individuals. This fact demands but little exertion to prove it. The inspection of the woods and plantations in any given tract of country, and the report of gentlemen who have hunted in various parts of the kingdom, will afford proof sufficient.

It, perhaps, may be said, the evidence is not conclusive, and that it does not comprise the whole of the united kingdom, but it is argued, that the deficiency of timber in one part of the country may be taken as a strong presumptive proof of a limited quantity in the other parts of it.

The demand for materials in ship building is, and will continue universal throughout the empire; therefore the supposition is, that a

prospect of a sufficient quantity to supply that demand for a lengthened period is very improbable, although not impossible. No doubt it will be stated, that the New Forest, Dean Forest, &c. are growing large quantities of the best quality, but what is this to the consumption by the whole kingdom? It may be asked whether the most competent persons have examined these plantations and timber, or if the most natural means have been adopted to rear the trees to the greatest perfection. The reports from those places are far from favorable to the supposition that anything like the quantity per acre is growing that is expected; this does not arise from any unsuitable state of the soil and climate, but from mismanagement and improper arrangements altogether. I do not hesitate to declare, that the most ample supplies ought to be expected from these national plantations.

But, supposing on the other hand, that there *is* a sufficient supply now standing and growing for at least a century to come, it is

easy to show, that this is the best way of making a deposit for the future. If it is not a national duty for every individual to grow a certain portion of oak timber on his estates, it certainly is the duty of the nation to provide an extensive supply of materials in ship building, for the use of future ages. The best proof that can be given to posterity of our greatness, is to furnish them with an ample store of what is indispensible to promote their happiness and prosperity.

What will be said of the present age a century or two hence, if a scarcity of oak timber is severely felt, but that the people were so much engaged in decorating the metropolis with showy and expensive buildings, which cost the revenue of a kingdom to maintain, that they forgot to provide the materials for repairing and renewing those wooden walls, to which England owes all her greatness, and in the decay of which her own existence is indisputably involved! Would they not call this "a foolish and vain generation" with some

justice? A properly managed plantation of a few thousand acres of oak trees would be some equivalent to the future inhabitants of these islands, for the charge of maintaining the metropolitan adornments. The splendour of public buildings is of trifling consequence to a nation—a gorgeously built Admiralty will do but little to preserve our naval character. A good ship, well found in stores, is essential to its existence; while sailors can say, "hearts of oak are our ships," they will sing, "hearts of oak are our men." It is a duty of no ordinary importance to provide a supply of the best materials for the erection and repairs of those buildings and things which are absolutely necessary, nay indispensible to the preservation of the commerce of a nation. The benefits conferred upon posterity, are imperishable monuments of the greatness of the donors. The age that relies upon buildings to perpetuate its fame, is short sighted indeed! Truly did the poet exclaim—

> "Ambition sighed, she found it vain to trust
> The faithless column and the crumbling bust."

According to Hoppus,* considerably more importance was attached to the timber on an estate some years ago than at this period; he says, in his preface, that "he knew a steward, who at his first entering into office was so exact, as to take an account of every single timber tree as well as others likely to become timber, in all the woods within his master's several manors." I have seen one of these timber books, and a valuable document it was to the owner, as the estate was well timbered: when taken, it was a complete inventory of the property. There are but few estates of the nobility and gentry which do not comprise from twenty to two or three hundred acres of wood land or plantations. Suppose a wood of thirty acres, with oak trees upon it, standing only ten yards apart, of one hundred feet in each tree, the price to be three shillings and six pence per foot, say fifty trees per acre, one thousand five hundred trees, at seventeen pounds ten shillings each, equal to twenty-six thousand pounds (round numbers). A calcu-

* The author of the tables by which timber is bought and sold at this day.

lation of this kind shows the importance of the subject much more clearly than the most elaborate argument. There are few estates which consist entirely of growing timber, therefore it is absolutely indispensable to have a person thoroughly competent to make the distinctions. The number of feet of timber and the number of trees likely to become timber, would be extremely small on many estates, and this circumstance is generally occasioned by mismanagement. Owners would be surprised to find, if they employed an efficient wood agent to examine their property, the words "stunted and dying" in his report, against trees just measurable, i. e. six feet long and six inches square, in some woods considerably more than three-fourths of the whole number. Every proprietor of an estate should have a timber book, which would give him a correct idea of his resources, and would show, at one glance, the "gold growing" for his posterity.

But this business requires to be placed in proper hands, for many estates most deplorably

display the want of some amendment in the management. Owners cannot be aware of the circumstance; if they were, it is but reasonable to suppose they would lose no time in beginning the work of reformation. It is the nature of the generality of measures calculated to improve, to be slow in their operations. It is true, that trees now planted would be a considerable period ere they would become profitable, but the owners would be benefited by the sale of existing trees, which annually decrease in value from decay. The investing of the interest of the capital raised by the sale of the present crop, would increase in value at a greater rate than the trees now standing, in many places even after the charges for replanting the land are deducted — proof of which can be given.

The plantations that have been made during the last century, afford but little prospect of producing any thing like those immense trees mentioned by different writers. Future inhabitants of this kingdom may want a vessel of

war as large as the Royal Sovereign, but where will they find an oak tree like the one used in the construction of that ship, and which came from Framlingham, in Suffolk, squared four feet nine inches, and whose length was forty-four feet? Mr. Jesse may have "a seat upon the roots which help to support one of the old magnificent oaks in Richmond Park," but it is only in parks, and the immediate home grounds of baronial mansions, that such trees are to be found. This store has begun to diminish at a great rate, and most of the trees have long past their prime, nay few, very few, are quite sound, therefore they would turn but to little account as timber. Humbolt, in his work on South America, and other writers of travels in newly explored countries, describe "the vast impenetrable forest and immense plains:" probably the one does not begin, nor the other end, abruptly; for even in this highly cultivated country, to this day the close observer may perceive that the thick and lofty woods did not arise at once, exposed to the winds from the open country. The advanced guard

of the forest naturally consists of extensive patches of gorse or furze, in bottoms and on hill sides, amongst which a few straggling and stunted white thorns are to be found, and as these increase in size and number, a few diminutive roundheaded oak trees are to be seen a little higher than the thorns, but in proportion as the ranks become thicker and more sheltered, the trees increase in size and height, until at length they arrive at full growth, and "from the centre of the forest deep," uplift their majestic heads in magnificent maturity.*

It is very extraordinary that planters should have disregarded this grand law of nature, and planted the fastest and highest growing trees in the most exposed situations, as if there was no proof of the effect of the wind upon trees in these kingdoms. But let them go to the sea shore, hilly districts, nay, level inland tracts of country; any one of these places would

* See Quarterly Review, No. 76, p. 439.—The planter may learn more from the perusal of this page than from the study of some volumes on growing timber.

furnish irresistible evidence of its effect. The incredulous should spend a high-windy day in a park, or a ground planted with single trees, they would see from the rocking and twisting of each tree, that none of the large fast growing species can advance to maturity unless completely sheltered by other trees. The Dennington Park oak must have been closely sheltered whilst thriving. The one that was called "The King's," was fifty feet high without a branch, or even a knot appearing; "The Queen's" was straight as a line for forty feet. The closeness of the surrounding trees protected their leading shoots, and killed the horizontal branches in their infancy.

Wood plantations and trees, in the narrow valleys which open to the west, generally show the injury which is done to them by the wind, more than those which are growing in any other situation. The reason is obvious; the former are sheltered from all but the point whence the strongest gales are received.

CHAPTER II.

Having laid so much stress on the effect of wind upon trees, it is necessary to offer some evidence as to the fact. Before the existence of plantations, timber was the spontaneous production of large woods and forests, where, amid an almost "boundless contiguity of shade," successive generations of trees arose and flourished, and at last decayed, ere the hand of man had marked them out for profitable uses. Each tree naturally received shelter and protection from the other, but there is little doubt that the removal of the old and decayed ones, to make room for their

rising families, was effected by the agency of violent winds.

But to quit the "presumptive" for the "circumstantial," a record of the ravages which the storms that have visited our island during the last five or six years have made, will furnish an almost inexhaustible mass of evidence, that there is in the action of the wind a greater impediment to the growth of timber than is generally imagined. The following striking and important instances may however be deemed sufficient :—"Chichester, October 13th.—We have experienced much boisterous weather in the early part of the week ; on Sunday morning, about seven o'clock, when the gale was at its height, and had left marks of its ravages between here and Arundle, a fine elm, at the Dairy House of Mr. W. Field, of Rumbold's Whyke, was snapped off at twelve feet from the ground, and the head driven rolling across the meadow until stopped by a strong fence. Trees, ricks, and buildings were damaged in every part of

the neighbourhood, although the fury of the storm appears to have been more severely felt in the parish of Walburton. Here a fine conservatory, belonging to Richard Prince, Esq. was totally demolished. A barn, the property of G. Halstead, Esq. and a machine house were in one minute levelled with the ground; as also a group of seven large elm trees, an ash pollard with a large limb driven from the trunk, and a great portion of the same was, in sight of several spectators, taken into the air and carried entirely over a field of ten acres. A barn, at Binstead, a mile distant, in the exact direction of the wind from the above scene, was completely cut asunder, the doors and centre roof being shattered, and the two ends remaining entire. A barn of Mr. J. Coote, of Middleton, was blown down; five wheat ricks had their tops blown off, and a great portion of their sheaves scattered to atoms."—*Sun Newspaper, October 16th,* 1832.

"The elm tree planted by Pope, in the Court Yard of Burlington Gardens, upwards

of a century ago, was rent in twain and blown down in one of the late equinoctial gales, greatly to the regret of the noble family."—*Morning Herald, November 2nd*, 1833.

"Upwards of thirteen hundred valuable trees were blown down by the late severe gales which visited the eastern coast, in the Earl of Tankerville's Park, at Chillingham."—*Tyne Mercury and Morning Herald, March 3rd*, 1836.

"The gales of Tuesday.—The damage in Kensington Gardens has proved far more extensive than was first supposed. In all about one hundred and thirty of the largest trees have been destroyed, a considerably larger number than that which perished in the hurricane of the 3rd of March, 1824. On no previous occasion has the wind made such havoc amongst the evergreens in the garden as at the present. In Hyde Park the devastation has not been so extensive, not more than about forty trees having been torn up, yet amongst them are some venerable and stately

oaks that had previously weathered many a storm."—*Standard, December* 21*st*, 1836.

Now, if a plantation that is not very extensive, and in which the trees are not sufficiently close together to protect each other, should be buffetted by a strong storm but once in fifty years, there would be but faint hopes of its thriving principle escaping complete destruction.

A light gale of wind, indeed, may not inflict any perceptible injury on a plantation if it assail it but one day, or even one hour in a year; and yet such a check may be given to its growth as shall afterwards be evidenced by stem and branch being twisted and shaken beyond all recovery.

It is very common to see comments in the newspapers on high winds and the consequent prostration of trees, "which for ages had withstood preceding storms," and such comments would lead many to infer that a storm

of equal violence had never before visited our island; but to estimate its fury by the number of trees that have fallen before it, is to "jump upon wrong conclusions;" for this reason, because in the olden time woods and forests presented a much denser and mightier phalanx, if I may be allowed the expression, to the winds that warred against them.

They who do not attend to the subject probably pass it over with the simple exclamation of "what a dreadful storm!" but when the matter is rigidly examined, it will be found that the storm was not so dreadful as at first it appeared to be. The case of Kensington Gardens for instance:—the storm of 1824 and the trees cut down in the spring of 1835 (see Morning Herald) caused an opening; trees which, perhaps, previously to these falls of timber had hardly moved a twig, had at the commencement of the recent gales to bear the whole of their force; being probably of greater length of stem, expansion of top, and having but little roots, it was therefore

impossible for them to stand in rough weather, when the wind caught them from the opening which had been made. When growing trees are closely surrounded by others, they have comparatively little roots or top, but as soon as those which screen them are removed, they generally cease to grow higher, and commence throwing out large horizontal branches; the head also becomes much thicker of leaves and twigs; this, in addition to the length of stem, gives the wind irresistible power over them. The stem of course nearly ceases to increase in circumference under these circumstances.

The account of the evergreens is copied to show that the force of the wind near the ground is so considerable, that dwarf plants may be more severely injured than has been generally supposed.

This fact strengthens the opinion that plants in young plantations ought to stand closely together. It is no uncommon thing to see, on the exposed peaks of hills and small

plantations in a level country, young trees planted four feet apart, and sometimes at a greater distance, all fast growing trees, which average, when full grown, from one hundred and fifty to two hundred feet; the deficiency of the growth of them excites surprise in the owners, and the inferiority of the soil is frequently considered the cause, when, in reality, it is bad management. If a richly sheltered valley is planted at the same time, and with trees the same distance apart, the trees may perhaps grow very well, but had double the number per acre been set out on hill tops and in small plantations, there probably would have been much less difference than may be supposed in the growth of the trees up to a certain period, although it must not be concealed that few such situations can be expected to grow trees to maturity, which have a great length of stem. In the Tankerville case, curiosity is somewhat raised to learn the particulars, because many planters appear to fancy all their duty is comprised in a very few words;

"To make a show their only game;
The picturesque their only aim."

There are some minds less controlled by reasoning than by precedent; to such the local histories of woodland districts will afford ample testimony to corroborate the opinion that oak timber cannot be grown to advantage unless closely sheltered; some may attempt to prove that although the largest trees have grown completely surrounded by others, shelter is not absolutely necessary: but those persons who think so, ought to examine thin plantations in exposed situations, or even single trees anywhere. Let them search the early historians, they will prove the fact that the woods and forests were thickly covered with trees; indeed Leland's description of Sherwood Forest may be offered as an indubitable proof. "More inland is Sherwood which some render the clear, others the famous forest, anciently thickset with trees whose entangled branches were so twisted together they hardly left room for a single person to pass." It was not only the closeness of the trees in the immediate vicinity of the large ones, but the shelter continued frequently for many miles round

them: it is also stated that in Hampshire alone there were nearly forty thousand acres of wood land, exclusive of New Forest, which consisted of ninety-three thousand acres.

As the attempt to grow such trees as are natives of foreign soils is become so general, it is necessary to show in what manner they grow there.

Mr. Brooke, in his travels to the North Cape, admires the beauty of the forest scenery, "where it is not so compact as to admit light and air," (Quarterly Review, No. 59, p. 120). Let it be observed that the words "to admit light and air" furnish the only excuse pruners and thinners of plantations have for the injury their plans do, wherever they are allowed to operate; and it is certain, the pine class stand much more closely in their native wilds than modern planters appear to believe it possible for them in order to arrive at maturity.

America, to this day, affords numberless proofs in support of the views here taken. A gentleman who has travelled extensively in the United States, and hunted for seven months in the Michigan Territory and State of Ohio, about one hundred and twenty miles southward of Lake Erie, on the banks of the Maumee River, has favored me with his opinion as to the distance the trees stand from each other in the back woods. "The stems of some nearly touch each other, while others vary in distance from five to six yards." This has been confirmed by a Michigan farmer; he states, that "where the trees are finest and tallest, he cannot drive a cart between them." These woods consist of trees of all ages; some in the last stage of decay, and others, in the immediate neighbourhood, just springing from the seed; so that the young are sheltered by the old.

This is the nature of trees—alike in the Old as in the New World. In corroboration of the statements just quoted, it may be

added, that Birbeck, in his Notes on America, page 102—3, gives a very intelligible picture of the forest of that country, and thereby conveys the strongest proof of the accuracy of the foregoing opinions on the growth of timber. "Yet the view of that noble expanse (the Ohio) was like the opening of bright day upon the gloom of night, to us who had been so long buried in the deep forest."

"To travel, day after day, among trees one hundred feet high, without a glimpse of the surrounding country, is oppressive to a degree which those who never experienced cannot conceive."

"His (the hunter's) visible horizon extends no further than the tops of the trees which bound his plantation: perhaps five hundred yards upwards he sees the sun, the sky, and stars, but around him is eternal forest."

"In his general habits, the hunter ranges as free as the beast he pursues, still he is in-

carcerated—shut from the common air: the breeze of health never reaches these poor wanderers; buried in the depth of boundless forests, they are tall and pale like vegetables that grow in a vault, pining for light."—Page 109.

On these statements it is assumed that trees naturally grow very closely together and in large numbers; therefore it is held that the evidence is sufficiently strong to remove all the objections upon which the advocates of the system of thinning plantations ground their arguments. Instead of admitting "light and air," as it is foolishly pretended, to benefit the health of the crop of trees allowed to be left on the land, we strongly suspect that the ruling motive is the amount of present money that may be gained by the ultimately destructive plan of periodical thinnings. In many cases this practice has been pursued with such ceaseless vigour, that all, or nearly all the trees which remain on some extensive estates, are stunted, decaying, and profitless;

and what is worse, the system continues unabated, and the plantations of tender age are subject to the same ruinous process.

It is stated that "vegetables are subject to many diseases: sometimes they are covered with a whitish matter, which sticks to them like dust, this is called the mildew. This does not proceed from insects as is commonly believed, but from a stagnation in the juices, and a commencement of corruption, which attracts the insects and entices them to lay their eggs upon it. The stagnation of the juices is the first stage of corruption, and it is supposed that this alone is sufficient to attract insects, because they are seen swarming by thousands as soon as, through a natural or artificial cause, the circulation of the juices is stopped in a tree. Hence it is, that the weakest and worst situated trees are most frequently exposed to this malady. If the insects were really the cause of it, it would be impossible to produce it by art: whereas, if a tree be designedly wounded, or deprived of the care it

requires, this is sufficient to bring the mildew. On a tree thus artificially weakened, thousands of insects settle at once, while the neighbouring trees are free from them. Thus, this corruption should no more be attributed to insects than that of flesh. It seems merely to be occasioned by the stagnation of the juices; an accident which many circumstances may occasion."

This, then, fully explains the cause of the noss disease, and that decay of trees which has been observed in so many different places. The only question is, whether it is ascribed to the true cause of the injury the growing crop of timber is suffering under; namely, a want of sufficient shelter.—In all situations where young trees are sufficiently protected from the wind, they are not only free from moss, but are healthy, sound, and fast growing. Where they do not stand close enough to shelter each other from the wind, they are bush headed, moss grown, short stemmed, twigged to the bottom, diminutive, decayed

at top, have mutilated branches, and are stunted: this is occasioned by the stagnation of the juices, and it is in no way so likely to be caused extensively as by the wind. Indeed, the question is completely set at rest by an examination of the statements and the experiments made to ascertain the force of the wind by the anemometer, an account of which is subjoined. Taking No. 3 (brisk gale) as an example, it is asked, how is it possible for the leading shoot of any fast growing tree to bear a frequent pressure of a pound weight upon a square foot of leaves? And it will be seen that a leading shoot of a fast growing oak tree, during the summer months, is only a vegetable stem, therefore unable to resist the most trifling force or pressure. As these calculations have hitherto been altogether omitted by preceding writers on plants, and practical cultivators of young trees, it is highly important to exhibit them here, because the failures are at once accounted for, as well as the cause of the checks in the growth of many large plantations. Injudi-

cious thinnings and prunings too are no less destructive, as we have previously shown.

Force of the wind ascertained by the anemometer, by Lind, Daniel, and others.

	Miles per hour.	Force in lbs. per square foot.
Gentle	4 5	0,079
Pleasant	8 0	0,260
Brisk Gale	16 0	1,170
High	36 0	5,280
Storm	62 0	15,625
Hurricane	88 0	31,250
Great Hurricane .	120 0	58,000

Phillips's Million of Facts, page 455.

This statement will surely justify all the arguments here advanced as to the necessity of impervious shelter for the growth of oak trees. It is a matter of surprise that this was not demonstrated long ago, for Strutt says, in his Sylva Britannica, "it is peculiar to this part of Renfrewshire, that the branches of trees generally extend more to the south-east than to the north-west." It is true he noticed

the effect, and it is astonishing he did not search for the cause.

If the fourth rate or high wind of five pounds pressure upon a square foot occurs but twice or three times in a year, it is needless to describe the effect of it upon plantations which have been too much thinned.

It might be asked whether the wind is as strong on the European Continent as it often is in these islands? Navigators describe the calms and prevailing winds in certain parts of the ocean; and Humbolt, in describing the forest of Oroonoko, states, "that the breeze, if ever it be felt, blows only after sunset," (vol. 5, p. 68). And again, "no breath of wind ever agitates the foliage." In those regions, the species of spruce described by Lewis and Clark, and also by Douglas, may ascend to the greatest height possible, from their not being moved or injured by winds. Hence, the immense length of such trees is accounted for, and it ceases to be a subject to excite wonder.

Perhaps the most conclusive evidence that can be offered, is to be found in the second part of the work of that distinguished writer, Humbolt, (p. 418)—"it is difficult to form an idea of the frightful noise made by thousands of these birds in the dark part of the cavern: it can be compared only to that of our crows, which, in the fir forests of the north, live in society and build their nests in *trees which meet at the top.*" It therefore appears that although nurserymen and others have introduced the species of trees, they have not advised an adherence to the manner in which they grow in their native forests. The few words of the excellent Baron, "*trees which meet at the top,*" are invaluable evidence, and clearly prove what the law of nature is on this point, and that the disregard of it by the modern planters and managers of woods and plantations, occasions all the mischief complained of. Where the tops of the trees press against each other throughout each wood or plantation, individual trees receive but a trifling share of wind, and the outside trees

are supported, so that few, if any of them, receive injury even in the roughest gales. This natural defence is a complete answer to the system so generally practised by modern wood agents, of admitting light and air to the stems of trees: it is quite clear that such a measure is not required.

Let it be supposed that the average height of the pine class and larch is one hundred feet, when arrived at maturity, (and this is much less than the length they grow to in their native mountains and forests); and also that the head of a tree, from the top of the leading shoot to the lowest branch is fifteen feet, this gives a clear eighty-five feet purchase upon the roots every time the wind moves. It is admitted by all planters and writers on planting young trees for timber, that the trees require shelter when they are set out, and a greater number is therefore set than could stand upon the ground should they grow to half their natural size. If trees require shelter when their tops are only three or four feet

from the ground, how much more do they need it when their heads are three or four score feet higher; but this is not all, for while they are growing to that height, the leading shoot has to ascend, therefore shelter is as necessary then, as earlier; besides, there is a greater expansion of top, which, with the additional length of stem, keeps the roots upon the constant strain, whenever the wind blows: thus, without admitting the principle of the lever, no one can be competent to manage woods and plantations. Frequently white deal logs are to be seen in the merchants' and builders' yards, of fifty or sixty feet in length, which will square from eight inches to two feet throughout: these white deals were from spruce fir trees, which, when standing, were considerably more than one hundred and fifty feet high, and had tops of thick branches, extending fifteen feet at least, covered with leaves impervious to the wind. How is it possible such a tree could singly stand the rough gales of our climate? Yet it is attempted, and in some places extensively; one

spot in particular could be named, but with what success the trees grow need not be said. The spruce is also frequently planted with deciduous trees, to form narrow belts, which is nearly as bad as planting the spruce singly. Were planters to calculate what such failures cost them, it would be some sign of amendment. It is no uncommon thing to see spruce fir trees set as screens instead of dwarf evergreen shrubs, laurels, &c. in places where they either die or grow rapidly; if the latter, they soon expose the objects they were set to hide, and when grown higher than the buildings, &c. they are generally blown down or broken by the wind. Surely nurserymen should have more compassion upon their ignorant customers than to recommend such unsuitable plants to them; they cannot however be blamed very much, as it is natural for a tradesman to endeavour to sell his goods. And he has, perhaps, a right to assume that his customers ought to consider his recommendations as a matter of course, and be able to detect those which have no legitimate

foundation to be depended upon. Too often the cheapness of plants causes their unsuitableness for the situation and purpose intended to be overlooked. But we would hint to all such purchasers, that "penny wisdom" has never been known to succeed in producing a result which we designate "Growing Gold."

CHAPTER III.

It is a remarkable circumstance, that they who have written upon the cultivation and management of timber, and they who are intrusted with the care of it, should have omitted to make themselves acquainted with the manner in which it grew spontaneously in the ancient woods and forests, and should have adopted, without any inquiry, an artificial system, at variance with every principle of nature.

The commissioners of the office of woods and forests, their inspectors and surveyors,

and also the owners of estates and their agents, have been the dupes of the nurserymen, who have uniformly recommended the pine class and other trees which produce timber inferior to the COMMON BRITISH OAK. On whom the blame rests for having in the first instance advised the mixture of so many kinds of trees, it is unimportant to inquire, but a universal adoption of the plan is a matter of astonishment. Many acres of pines have been planted for game covers, and the practice is continued, although it is not the best arrangement that could be made, inasmuch as when the tops of such trees ascend to ten or twelve feet, the lower branches die off, and then the game are as much exposed as if there were no trees.

The wood agents have followed the practice of their forefathers in thinning the old woods, utterly regardless of the young trees springing spontaneously amongst the old ones, and which they have cleared away with the underwood: hence the system has worn itself out.

The author speaks of facts: in many woods all the timber has been cut, and the few small trees which have arisen by chance are generally bush headed, short stemmed, and show no signs of growing to maturity. The chief reliance for a profit appears to be upon the growth of underwood. Profit from the growth of oak seems to be a complete casualty.

The adoption of the pine class of trees as a substitute for oaks also exhibits an unaccountable absence of inquiry; previously to so extensive an introduction it ought to have been ascertained whether the quality of the pine timber grown in this country would be equal to that produced in the severer climate of their native regions. Those persons who are intrusted with the care of estates where the oldest pine trees are standing (provided there was an inclination) could answer this question satisfactorily. As the excellence of English-grown fir timber has not been proved, there is reason to believe that it is very inferior to that imported. This is not from the defi-

ciency of size, as there are trees which would cut into boards of the same length and width. If the qualities are equal (which is implied by the continuance of the formation of plantations of pines) how does it happen that the agents sell the produce of the estates of which they have the care, at so inferior a price, IN LOTS, and not by measure, as oak timber is sold? The truth is, the quality is so inferior they are glad of a customer, and will generally take any price offered. Although many inquiries have been made, only one person could be found who had bought home-grown fir by measure: he gave the magnificent sum of six-pence per foot!! one seventh of the price of oak. Notwithstanding this, land agents continue to purchase larch, Scotch, and spruce fir plants, of the nurserymen, as if Britain had no native trees worth cultivating. They appear spell-bound to an erroneous system; one of them has even ventured to declare that no improvement can be made and no inquiry is necessary; although, he could get no more for larch poles of eighteen years standing,

(it can hardly be called growth) than one penny each ! ! !

The professional planters also styled themselves *pruners* (Pontey for instance); if in the former character they had recommended planting trees of one species very closely together, there would have been no prospect of employment in the latter capacity; because there would have been no horizontal branches to be cut off. It is hardly possible that they could really believe that the system which they recommended was in accordance with the operations of nature, or that it was the most advantageous one that could be adopted by their employers. The same system has been recommended for the south of England as for the north of Scotland, notwithstanding the great difference of the climate: in the latter there are "natural pine forests," the timber of which is stated to be of excellent quality and full of turpentine, and which no doubt is matured by the coldness of the situation:—verging upon perpetual snow.

The first introducers of these trees into the midland and southern parts of Britain, must have stated some reason for the preference, but it could not have been the superiority of such timber over that of oak, nor that pines would grow better on inferior soils than the native trees, because, in every part of the kingdom, oak is to be found growing on poor soils of all kinds. Larch, &c. have been planted amongst old oaks, as if they were of equal, if not superior value to the native trees; in other places they are used as nurses for young ones. This favors the opinion that the advocates of such a system were deluded by the notion that the rate of growth of the pride of our forests was inferior to that of the pine class. Indeed, there is a sort of traditional belief in many parts of the kingdom, that oak is a slow growing tree, a belief which was in all probability induced in the first instance by its longevity, and afterwards strengthened by the erroneous system of cultivation. But the measures of the size of various kinds of trees, near oaks, given in the

following pages, show *an equality of growth* which at once proves that the preference for exotics is both undeserved and indefensible. It is most extraordinary, that there should be authors who admit this equality, and at the same time persist in recommending fir trees.

The present system of managing the pine plantations has also run its length, for there are very few trees of fifty feet in height, that are not stunted and decaying, or decayed: indeed, similar effects are to be seen in many under that height, although, by a reference to the authorities, it will be found that it is not more than one third of the average height to which they grow in their native woods and forests.

Matthews says, "there must be some constitutional tendency to corruption in the larch, as the rot is often found to take place in the most luxuriant growing plants, in open situations, branched to the ground, and growing in deep soil, free from stagnating water." (p.

81.) The truth is, that larch grows at a great rate on rich soils, therefore it requires impervious shelter, that its leading shoot may be uninjured by the wind. When injury takes place, branches extend themselves from the middle part of the stem, but, at the same time, decay commences in the centre of the lower end. It may have been that the plantations which are now decaying required thinning, but there was certainly no occasion for the axe to be laid to the root so frequently and extensively. "It wrought destruction where it should have spared." There is ample evidence that many plantations have been ruined by premature thinnings; amongst others, those belonging to the late Bishop Watson, whose publication at least sanctioned, if he did not originate the baneful practice. Of this fact I was informed by a gentleman who has a brother living in the neighbourhood. There is also some reason to doubt whether the kinds of trees which grow to so great a height will arrive at maturity on situations where they

have been planted, even under the most skilful management.

The question as to the quality of the timber of larch appears not to be sufficiently attended to. "Larch is valuable only for the grosser parts of buildings, as beams, &c. for the finer parts, it is so much disposed to warp and so difficult to be worked, as generally to preclude its use." (Matthews, p. 103.) This is a well known fact,—ladders made of it have become so twisted as to be unfit for use. He also states, "it yields to the depredation of the insects as soon as any pine timber, and that the sea worm devours it in preference to almost any wood;" and that "some experiments were made at Woolwich, in trial of the comparative strength of it and other pine timber, when it was stated to be inferior to Riga and Dantzic fir, pitch pine, and even yellow pine."

Surely these important facts ought to be urged against its general introduction into

plantations, as it tends so materially to diminish their value. Yet, we repeat, it is used by the planters of the present day as if it were equal, if not superior, to oak timber for general purposes.

Matthews reviews Billington's practice in Dean Forest somewhat sharply; indeed he has a good title to do so, if the system pursued is not better than that which is practised in the Royal Parks near London. Yet, instead of correcting him, he falls into an error equally glaring. The larch are recommended to be preserved, notwithstanding his account of the inferiority of the timber, and the oaks to be cut out; probably, if the larch had been trimmed on the sides nearest the "stunted oaks," and these trees cut down, they would, the following year, have produced large shoots from the stubs, which, in a few years, would have grown to the height of the larch, but it is seldom, if ever the case, that in mixed plantations, they grow to their full and natural altitude.

It, however, requires extensive practical knowledge to secure a crop of oaks in mixed plantations; it is not only the most expensive method, but the slowest, however skilfully the trees may be PRUNED and THINNED; therefore it is the least profitable.

There are estates which many people who are unacquainted with the subject believe to be well stored with timber, but in reality the American term "lumbered," is the only one that can be justly applied to them. One in a maritime county for instance, the property of a nobleman: there are large trees of all kinds; oak, ash, larch, cedar, spruce, Scotch, Weymouth and other pines, beech, &c. It appears from an article in a respectable periodical publication, that these trees are now nearly, if not quite, a century old, therefore, if they had all been of a marketable quality, they would now have been a vast pecuniary resource to the noble owner; "but oak is the only saleable produce of the estate in large quantities; the beech is sold for fire

wood, as much as can be laid upon a waggon for sixteen shillings, and the seller thankful for customers at that price: very large and perfectly sound trees are cut into billets for sale and for home consumption." This is also the case upon the estate of a nobleman in a midland county: yet these noble lords are large buyers of foreign timber, although those very parts of their estates on which the inferior timber is grown, would grow oak timber of the best quality, under good management. Each of these noblemen having very large families, an increase of property is desirable, although their estates are very extensive; but even if this was not the case, as patriots, they ought to grow large quantities of an article on which the safety and commercial greatness of the empire mainly depend for their very existence; and yet they continue to plant the inferior wooded trees. What are their agents about? Is timber property or not? It is to be feared these noblemen have not disciples of Hoppus for "*stewards*"; perhaps they are like the late

—— —— who made it a rule never to go into a timber yard himself, because it was *a dirty place!* or like the Marquis of ——'s agent, who did all the business of his office by deputy, except corresponding and dining with his patron!! No wonder the plantations under his care were in a thriftless state, and that his lordship went abroad to retrench. Landowners forget there were such men as Brindley, whose genius more than doubled the value of the property he superintended.

Matthews suggests a very whimsical plan to remedy the mismanagement of the Royal timber and plantations,—that of giving *titles* to those persons who can produce a certain number of oak trees upon their estates. This does not appear to be necessary. If landowners are convinced it is a profitable method of applying the worst part of their estates, and they have also a clear opinion when the bonus will accrue to their heirs, they will no longer be directed by the landscape gardeners and the speculating nurserymen.

Let all at the head of this department of the government examine the reasonableness of the suggestions made to them, and encourage those who have the best title, without favor or affection, and eventually the proceedings of the officers will cease to be a subject of ridicule; the only motive that we have for observing their faults is to correct our own.

From an examination of more than forty estates in various parts of the kingdom, the following are selected to show the general state of the timber growing on them.

Estate, No. 3, Richmond Park.

It is very probable that some part of this park was planted under the superintendence of Evelyn, as there is a considerable number of trees of the necessary age to sanction the supposition. These trees no doubt grew well for many years, but they have for a considerable time past ceased to thrive, from having been

thinned too much. It was stated by a person who had witnessed several falls of timber, that at least two thirds of it was decayed, and the oldest timber in the centre of the park bears striking evidence of its having long ceased to increase in value. In various parts of the park several trees were lying down, the remains of former falls, all of them more or less decayed; whether they were unsold, or the purchasers had failed to take them away, could not be ascertained, but probably the former, for a purchaser seldom gets a good bargain in buying decayed oak timber, unless the grower makes a considerable allowance; as there is no calculating the extent of the defects, it is generally an article not readily disposed of in large quantities.

Before oak timber arrives at a state of natural decay, it often becomes of a mahogany colour, which decreases its value at least one fourth or two fifths; for the best quality would be cheaper at five shillings than red oak is at three shillings per foot.

Standing at the north entrance of this park, a stranger might exclaim, what a fine show of timber; a closer examination would not confirm this opinion, as there is a considerable number of pollards in some parts of the park; there are, nevertheless, some good looking trees, but, with trifling exceptions, none of them will increase in value. When large trees arrive at this state, the timber loses much of its toughness, and frequently receives great damage from felling, however carefully or skilfully performed; and if the decrease of capital is estimated from this loss, and also from decay, from the time the trees arrive at full growth, and if the loss of interest is also computed, these ancient ornaments are of the most expensive description. In reality it is bad taste to endeavour to preserve that which nature has assigned to decay: there are some who advocate the preservation of these vegetable mementos of the "olden time," who ought to know the period in which saplings will grow to the same size; therefore, why not remove these old trees and replant the land?

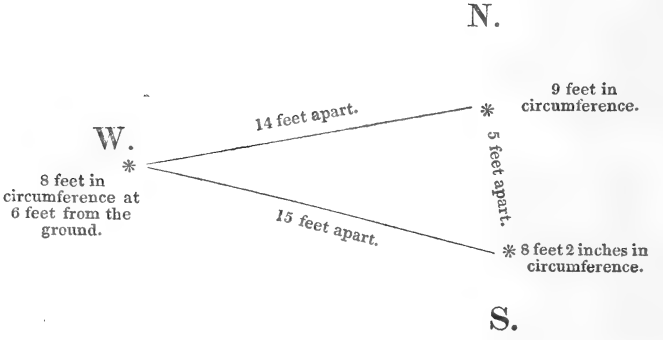
This is a case, in point, in which neither money is required from the pocket nor land from the rental (as stated in p. 5); and there are many thousands of acres of wood land on which the trees are equally thriftless, but which would yield a surplus after a crop of young trees had been planted, in the best manner, upon the land. It appears that they who introduced the fashionable trees in this place, disregarded all the evidence which an examination of the ancient oaks and thorns afforded them; the latter were evidently the natural nurses of the seedlings of the former: why this indisputable law of nature was disregarded, and the reverse became the general practice, cannot satisfactorily be accounted for. In all the ancient forests and woods, hazel, thorns, and other dwarf trees were the nurses of young oaks: in almost all the modern plantations, fast growing large exotics (pines, &c.) have been adopted. The tenacity with which the fashion is adhered to amidst so many failures is most extraordinary, but the impolicy of it is becoming so obvious, that they

who are interested in supporting it, will soon find their efforts ineffectual.

The oldest person to be met with in this place was rather under seventy years of age, he was "native of the park," and, during his recollection, the oak trees had stood at least two thirds thicker than at this period; some felled trees on the south side of a rather steep hill were less decayed than others, which, when standing, were exposed to the north west; although the former were older, they were not so tall by twenty feet, therefore these trees suffered from being more exposed, in proportion to their greater length of stem. Indeed, there is no doubt that all the original trees to the north west of this wood have been cleared away, and that the work of thinning has been too rashly executed in other parts; consequently there can be no wonder at the early decay which is manifested. Many persons having the management of timber do not appear to be aware that shelter is as necessary for the preservation

of it, when advanced in growth, as while it is growing.

There are three trees standing in the wood on the north side of the park, deserving great attention, from the circumstance of their standing closely to each other; their situations will be better understood by the following diagram:—



It is to be regretted that the means were not at hand to give an accurate measure of the number of feet in each of those trees, and thereby show the exact value, and the space of ground they occupy. They are fifty or sixty feet in height, therefore it is but a fair

calculation to suppose the north tree will square seven inches at the end of forty-five feet; thus, the contents in square feet will be ninety feet. The west tree is twelve feet by twenty-four inches = forty-eight feet. The south tree is also twelve feet, and a fraction more than twenty-four inches in girth, which is given in. It is but fair to observe, there is no allowance made for the bark in these measures, as the unmeasured timber, top wood, bark, &c. are of more value than the amount which would have been deducted for it. The north and south trees bend a little from each other, but so little as to be no impediment to their growth. There are but few such instances as this now to be found, therefore it ought to be preserved as a proof to all planters and managers of timber, that trees will grow to so large a size when close together. No doubt they were common in the last century.

There would be great difficulty in thinning trees of this size when so close together: if

trees, seventy-five years old, are healthy and growing, although only ten or twelve feet apart, thinning them is of no consequence, as some will outgrow the others and become large trees; so situated, the underlings will not decay until at a great age, unless under some very peculiar circumstances, and but little loss will be sustained by their remaining.

The greater part of this place is surrounded by a belt, and most probably the north side was first planted; there is the usual mixture of trees,—beech, birch, oak, white poplar, elm, ash, &c. which have been thinned without judgment. On the south side the following trees were measured, at eight feet from the ground, but an accurate date of this part of the belt could not be ascertained.

	Inches in circumference.
Oak, ...	34
North beech, ...	40
South ditto, ...	34

This proportion the oaks bear to the other trees throughout. Near the north gate is a

patch of trees, about an acre, planted, it was stated, forty-five years ago; the trees consist principally of Spanish chesnut; there are also beech, birch, and a few oaks.

	Inches in circumference.
Oak, branched and feathered, ..	33
North Spanish chesnut, ...	37
East ditto, ...	32
South ditto, ...	50
West ditto, ...	33

Thus, the average circumference of the four nearest Spanish chesnut is thirty-eight inches, it being evidently the crop intended; they grow well together, but even under the disadvantage of being branched and feathered on the stem, from having too much space, the size of the oak, when compared with that of the other trees near it, varies so little, that the deficiency is amply compensated by its acknowledged superiority for general purposes. On the west side of this patch the trees are not so large, and are stunted from standing much thinner; several of the Spanish chesnuts

are dead topped, branched, and feathered; there are also two or three birch of considerable size.

There is another patch of trees of the same age as the above on the south east side of the park, which grew very luxuriantly until thinned too much; the trees stand at very irregular distances apart.

	Inches in circumference.
Oak, ...	32
North Spanish chesnut, ..	34
South ditto, ...	38

Some very conclusive evidence can be offered on a celebrated estate, of the impolicy of mixed plantations, if that from this estate should fail to be sufficient.

	Inches in circumference at eight feet high.
Oak, ...	34
North Spanish chesnut, ..	40
South ditto, ...	35

Before Spanish chesnut is extensively used in plantations, it ought to be ascertained

whether it will bear the bending for planking, and the battering of cannon, to which ships of war are liable; this is doubtful, as it is very subject to split of itself; therefore a cannon shot would do twenty times more damage to a ship built with it, than to one made of oak.

There are several small plantations of recent date about this place, consisting of oak, Spanish chesnut, pines of various kinds, broad leafed elm, poplar, alder, &c. but they are all set too far apart in the first instance, so that none of their leading shoots are sufficiently protected from the wind; and the space admits of the oak branching too much, hence, there is some allowance to be made for their not being so tall as the Spanish chesnuts. For the last three or four years those plantations have grown as well as such an arrangement would allow: but there is still little, if any probability, that the trees will grow to maturity.

It may perhaps be stated that these plantations were made for the preservation of game;

a critical examination of them will prove that they are as unsuitable for this purpose as for growing timber; but, admitting some were made for the former purpose, others ought also to have arrangements suitable to the production of timber. *En passant*—there is one circumstance connected with the preservation of game, which should incite inquiry; eight out of ten of the murderous battles so frequently taking place between gamekeepers and poachers, generally happen when the latter are in pursuit of pheasants; they are supplied with guns, which are often pointed at those who oppose them, and they trust to the shades of night to secure them from detection. A plan is ready to be submitted to the public for the preservation of pheasants, without night watchers of any kind: it conveys the strongest presumptive proof of its efficacy, and it can also be supported by extensive oral testimony. One hundred brace of birds might be kept in perfect security, in the place above alluded to, from October to March, without the slightest difficulty. When noblemen and landowners

are sitting in their drawing rooms, and hearing the report of guns from the poachers, in their home covers, they do not require to be told the amount of such an annoyance. Rearing pheasants to supply some covers near London might be made a source of great profit, as fourteen shillings per dozen have been given for the eggs of those birds, in order to rear young ones for such places, to the great encouragement of poaching in the provinces. But we are digressing too far.

On the north east side there is a plantation principally of oak, originally planted four feet apart, but it has been thinned irregularly, therefore it does not grow so well as if it had been planted thirty inches apart, or less; every oak tree makes more head, the stems are small and short in proportion; but what appears extraordinary, is, the edges of the plantations are thinnest of trees! This is exactly contrary to every principle that experience furnishes, but it does not imply that the trees should be cleared away in the middle for a POTATO

Garden, as is the case here; on the contrary, the trees in all plantations should stand closely together, and meet at the top. It is the duty of every person who has the care of such property, to examine it thoroughly at least once a year. He who fancies himself able to draw up a correct report of the state of a plantation, by merely riding round it, is assuredly one of the second-sighted school; it is admitted that it is not a very pleasant occupation to examine young plantations, especially in damp weather, but no one should be appointed to offices who is above doing the duty of them.

Happening to remark to the head keeper that an extensive part of this place, now covered with rushes, fern, and bushes, would make a very valuable plantation, it much offended the gentleman; why it should have had that effect, it is difficult to discover, unless he saw an encroachment on his six hundred pounds per annum, an abridgment of the pasturage of his numerous herd of

cows, or it was likely to diminish the sport of rabbit shooting, with which he occasionally treated his cockney friends. As rabbits are very destructive to young trees, where they are numerous, regular warreners ought to be employed to keep them down: the skill of these men is extraordinary; for instance, when a ferret is put into a burrow, the warrener places his ear on the ground, and keeps quietly shifting his position until from the noise which is conveyed by the earth, he finds he is exactly over the ferret and rabbit: he then digs them out, having not unfrequently to proceed to a depth of four or five feet.

The place under consideration is the best possible for the display of skill, oak being the weed of the soil; the picturesque doctors have had full liberty to exhibit their plans, but they have signally failed in their efforts: and all attempts to act in defiance of the general laws of nature will ever prove abortive. It is nothing else than playing at

growing oak trees :—where is the prospect of producing a rival to that of Hatfield Bog celebrity ? They who have the management of the timber in places of this kind, and who attend too much to the scenery, neglect one consideration which surely ought to be apparent in all their proceedings, namely, the *future look* of the place, as well as the present one : they should bear in mind that by cutting a glade here, an opening there, taking down a few trees to shew that spire or this steeple, and a windmill or two, the wind is admitted to the trees which remain ; they soon become dead topped and unsightly to all who admire healthy vegetation : posterity will have little to thank them for but a few decayed and mutilated stumps. Some may have an idea that such contrivances give an air of grandeur to a place ; it is only the appearance that plated articles bear upon a sideboard :—gratifying to none but novices.

Possibly when the amount of the profit to be obtained by judicious management of

oak plantations is better understood, most of these evils will be remedied.

The timber and plantations in some other Royal Parks are in quite as bad a state as this;—there is not a single tree, from thirty to a hundred years old, in the parks which I have examined, growing at its full natural rate. It, perhaps, will be said, the intention is not to grow timber for profit in this place, but for ornament only; this admission is sufficient, because it must be granted that the finest specimens are the greatest ornament. These can only be grown under the most impenetrable shelter; when a tree is full grown, then is the time to clear away the trees near it, so that it may be seen and contrasted with the round headed oak, or thorn bush in the distance.

On the south side there is a plantation containing firs of six or seven years' growth, planted, as it was stated, because the soil is too poor to grow oak trees, yet there is an oak tree of considerable size growing in the middle

of it. The planter appears at length obliged to acknowledge his error, for during the last season some tall fast growing young oaks were taken from a rich soil and sheltered situations and put between the firs: this is not quite in accordance with the opinion experience furnishes as to the best way to ensure a crop of oak trees on such a soil. It is admitted to be of a very inferior description, but as there are oak trees of considerable size growing near the fence, as well as the one tree within it, proof is afforded that a crop may be grown upon it, if a proper system were to be pursued. It being nearly the most elevated situation in the park, consequently it is the wind which gives the old trees such a shattered and thriftless appearance.

How the system of mixing so many kinds of trees in plantations became a general practice is not easily explained, as it does not appear ever to have been the case in any of the ancient woods and forests, in which there is reason to believe the trees grew

naturally; whether they did so here or not I have no means of knowing; it is however certain a good crop was raised, and there is not a single vestige of a pine stem of the same age as the old oaks in this place, which is a proof there were not any to draw them up; indeed there is evidence sufficient to show the oaks originally stood very closely together. Yet, in defiance of this, in the belt and every plantation, the successive planters have thought it indispensable to mix all kinds of trees, regardless of the quality of the timber they produce. On some estates it has been the practice to plant two trees for nurses, and one oak, therefore to give all the oaks the benefit of one thinning, all the nurses are removed; this gives the crop two thirds more room, usually from four feet to twelve. In many of these plantations the oak trees are completely overgrown; some of them are very tall, others very short; the former are generally small stemmed and with a considerable number of branches. When the nurses are removed the wind has such power

over them, the stems being weak, that the first gale bends them so much as to force their heads to the ground. It is somewhat singular that trees which grow in a manner that is calculated to do the least injury to the crop intended, should be so seldom, if ever used, namely, the small leafed elm; its branches all grow upwards, none horizontally, therefore it does not impede the growth of the trees near it so much as the Scotch fir.

The evils of mixed plantations are that some kinds of trees recover transplanting sooner than others, and there is not in all of them the same rate of growth afterwards, consequently the leaders of the fastest growing trees suffer from not being sufficiently sheltered. Every time the wind blows they are whipped (as it is termed) and severely injured by the horizontal branches of the trees that grow against them, and which were at first planted for their protection. This is the case with Scotch fir when used for nurses with oak, it recovers transplanting

the second season and commences growing; oak merely keeps alive, yet the Scotch fir is used for nurses in New Forest, &c. It may be asked, did any of the old oaks which have grown or are standing there require exotics to rear them to maturity? No, it must be answered; therefore it is but just to presume that it is unnecessary, if not improper now.

Some land draining done in this place displayed a want of common practical knowledge in the person who set out the work: if it had been properly planned it would have been much more effective, and would have continued so more than double the time it now will, without incurring the expense of a shilling per acre more.

This park has been supplied with deer from other places to the amount of nearly restocking it; why it was necessary, perhaps the inspector would like to know; but if the cause be allowed to continue, the park will require a similar supply in a few years.

Frequent complaints have been made of the want of flavor in the venison, which may in some measure be accounted for. The keepers in the winter catch all the bucks * which they have to kill in the summer, and put them into paddocks to fatten, which they do by lying quiet, but they are compelled to subsist upon a coarse kind of grass without variety, unless it is some expensive artificial food. But they are in this manner MUCH MORE EASILY KILLED than when ranging in a large park, selecting the sweetest and best herbage of all kinds. Were it not intruding too much on the duties of the inspector, a few additional hints could be offered to the rangers on this subject, to show that some improvement may probably be made in the flavor of the venison. It is admitted that there are good and bad farmers, and also superior systems of managing parks; a brief statement of the prevailing errors now practised would prove the folly of them, and the advantages of the best method, in a striking

* This is done in a very bungling manner.

point of view, the PECUNIARY part of it is not the least. A person well acquainted with the management of deer and parks could instantly discover any imperfect arrangement. There is a degree of folly in appointing a person to examine the abilities and conduct of others who is not an adept in all the details of the business he has to superintend.

CHAPTER IV.

The following estates are private property, therefore the names of them are not given; but should an application be made to show the trees upon any of them, endeavour will be made to obtain permission from the owners.

Estate, No. 4, —— Wood.

On this estate are some very old trees, principally oaks. There is ample evidence that they grew closely, intermixed with others of the same species, which were cut down at various periods. There are also some plan-

tations on the estate, for the ages of which I am indebted to a friend.

No. 1.—An oak plantation of twenty-six years' growth; the circumference of the trees, at six feet from the ground, varies from twenty to twenty-six inches. They were originally set three feet apart, and at a moderate calculation are worth six pence each, bark and top included.

No. 2.—Fine common British oak, forty-three inches in circumference, or twelve feet by nine and a half inches = seven and a half feet, at three shillings and six pence per foot = one pound six shillings and three pence, exclusive of top and bark.

	Inches in circumference.
North, edge of belt, . .	
East, Larch, ...	50
South, Sycamore, . . .	51
West, Larch, ...	42

These are of fifty-six years' growth.

No. 3.—Are the best specimens of seventy five years' growth that have been met with; they are only single trees, and therefore do not afford clear proof of the average rate of the growth of oak trees, as the largest of them is most sheltered and may be considered the nearest to it. The circumference is seventy-two inches, at six feet from the ground, and seven feet eight inches at one foot from it.

Estate, No. 7, —— Wood.

This wood comprehends at least one hundred acres, and the produce of it is the usual description of oak trees and underwood; the former stand from fifteen to fifty feet apart; and in some places only as many yards intervene. For instance, on the south side of a tree there is another tree, only five yards from it, whilst, on the north side, the nearest is fifty or sixty yards. They are low and round headed: on the south west side of the wood they are still smaller and

lower, and show every symptom of injury from the wind; being mutilated and moss grown. These trees make the least possible progress indicative of being alive. A reverend gentleman who has some woods of his own, a few miles distant, is of opinion that the failure of the crop of oak in this place is occasioned by the wetness of the soil. In answer to this, it may be stated that the oak underwood is healthy, the stems bright, clean, and without moss, and the extensive fall of large trees, not quite fifty years ago, proves the soil to be suitable for growing oak trees to perfection. The owner, however, does not give this evidence due attention, by his planting ash for stubs. Possessing some fame as an agriculturist, he is taken as an authority on the cultivation of timber. But there is a wide difference between growing wheat and growing oak trees; his ability as a farmer is admitted; but at the same time it is contended there is no evidence on his own estate in favor of his knowing anything of the principle of the right cultivation of oak trees.

He may be a disciple of the person who recommends thinning to thirty-five feet apart, but it is not stated at what size and age this is to take place; and as it is in defiance of the evidence of all kinds here given it does not require further notice. The oak trees upon this property grow so slowly, there is very little perceptible increase, although they have been closely observed many years. On a recent ride through this wood, there were several cut down; many of them squared only six or eight inches; and yet they were decayed at the lower end, which corroborates the opinion before expressed, that injury to the leading shoot causes immediate decay at the centre of the stem.

A certain landowner who has an extensive tract of poor sandy land planted with oak trees, has taken much trouble to circulate a statement that wet land, namely, adhesive clay soils, &c. will not grow oak timber of good quality. His testimony is clearly liable to the suspicion of being biased by interested

motives; therefore not worth much, if any attention, except, indeed, as a proof that oak will grow on poor sandy soils. If there had been any justice in the opinion, that oak grown on light sands is of superior quality, it no doubt would have obtained a better price in the market. The soil of this estate is an adhesive clay, as is also that of many hundred acres of wood land in the neighbourhood, on which oak timber of the best quality has been cut.

Estate, No. 24, —— Plantation.

This is a plantation of considerable extent, and it furnishes a large mass of evidence, to strengthen, if necessary, that already given. There were several kinds of trees originally set, but the pines have as usual overgrown the native trees, with the exception of a few instances.

	Inches in circumference.
No. 1.—Oak, ...	29
North, Spruce, 9 feet from oak,	32

		Inches in circumference.
East, Spruce,	18 feet from oak,	$12\frac{1}{2}$
South, ditto,	21 ditto, ...	27
West, Scotch,	18 ditto, ...	35

The oak average three inches in circumference more than the pines.

		Inches in circumference.
No. 2.—Oak, ...		38
North, Larch,	33 feet from oak,	29
East, ditto,..	12 ditto, ...	33
South, ditto,	18 ditto, ...	29
West, ditto,	18 ditto, ...	27

Hence, it appears, that the four pines average eight and a half inches less than the oak.

		Inches in circumference.
No. 3.—Oak, ...		30
North, Scotch,	27 feet from oak,	36
East, Spruce,	27 ditto, ...	34
South, Larch,	21 ditto, ...	23
West, Scotch,	10 ditto, ...	35

The average is two inches more than the oak

	Inches in circumference.
No. 4.—Oak, ...	39
North, Larch, 20 feet from oak,	40
East, Spruce, 15 ditto, ...	31
South, Larch, 13 ditto, ...	$37\frac{1}{2}$
West, Spruce, 30 ditto, ...	32

The average is four inches less than the oak. The crop was no doubt materially injured by the trees having been thinned at very irregular distances. Unless otherwise specified, the measurement was taken at six feet from the ground.

Estate, No. 30, —— Wood.

This wood consists of three hundred acres, and, till within a year or two, it included many acres more; it is therefore particularly entitled to an accurate description. The underwood consists of hazel, oak, maple, white and black thorns, and a small portion of ash: the oak underwood is bright, free from moss, healthy, and making considerable length of wood annually.

The largest of the oak trees are underlings of the former crop, and there are some which were making considerable progress under its shelter that are now completely stunted, moss grown, twigged, and dead topped: this wood proves that it is not only EXTENT, but PROXIMITY also, which gives protection to growing trees. When, as in forests, they grow naturally, the *stems* of the trees for perhaps some miles afford impervious shelter; one acre only, bearing one hundred large trees upon it, would be a pretty good screen, but if a square mile were covered with large trees, the shelter would be complete.

Estate, No. 42, —— Plantation.

This estate is in the county of Norfolk, in which an extraordinary number of acres of inferior soil have been planted with various kinds of trees. Where much, of any description of work, is going on, superior systems are expected to prevail, but nothing appeared in this district to show better management

in planting trees than where the business is less practised. It appears to be the general system to mix all kinds of trees, and the situations were frequently the worst that could be selected; the size of the trees when set out did not correspond, nor were they close enough,—the land being sandy, the roots and fibres had but a very slight hold of the soil; and the opening which the oaks and other deciduous trees make whilst they are leafless, gives the wind ample power over the spruce and Scotch trees, effectually to impede their growth.

A large plantation of Scotch firs, set in rows from four to five feet apart, looked very sickly and thriftless, although in a valley. Planters do not heed what the wind millers tell them,—that the wind is sharper in a valley than on a level country. The system of two pines and one oak was observed during the day's ride from plantation to plantation. Some good oak trees were indeed observed on one estate, and only one; and in perfect

contrast, immediately adjoining, were several wretchedly managed pine plantations.

UNDER OR BRUSH WOOD.

It appears by a provincial newspaper that a noble Earl has sold some underwood of twelve years' growth at sixteen pounds per acre; but it does not pay for growing even at this price, as the land on which it grew would have let for more than twenty-five shillings per acre, per annum; the interest and compound interest of which, clear of all deductions, make the amount, at the end of twelve years, considerably more than the sum obtained for the underwood.

But taking another view of the case, most probably the underwood which obtained this high price consisted principally of ash poles. There can be no doubt of their being more useful than hazel rods and white thorn bushes; therefore, why not grow the former? The practice of making gate hurdles for

folding sheep with split ash and oak poles is becoming general, and renders this arrangement the more necessary, and compels wood agents to alter their plans, as woven hurdles are more expensive in the end, and cannot be repaired. It is admitted by all writers that trees increase at a greater rate as they grow larger; therefore, if an acre of ash poles be cut at twelve years' growth, they probably are increasing at twelve times greater rate per annum than during the first year of their growth; consequently, by cutting them at this age, there is a great loss to the owner.

They who take the trouble to investigate, will easily satisfy themselves that the two crops, namely timber and underwood, cannot be grown to perfection upon the same land, at the same time; one of them must suffer; the hazel, thorns, ash, &c. will not grow without light and air. The leading shoot of no fast growing tree can ascend unless completely sheltered.

CHAPTER V.

THE GROWTH OF OAK.

It may be seen that the circumference of oak trees is so near to that of the pine class, Spanish chesnut, and other fashionable trees, standing within a few feet of them, that oak can be no longer considered a slow growing tree: the deficiency, whenever it occurs, is occasioned by their not bearing transplanting so well as many other species; a disadvantage never to be overcome when surrounded by other kinds of trees which recover from transplantation earlier, and, as a natural

consequence, overgrow the family of oaks which they were intended to nurse.

Yet, even under the unnatural, mixed system, there is ample proof of a great rate of growth, equal in circumference to the pines; the latter grow to a greater length of stem, but in this stormy climate it is in reality no advantage; in fact, it furnishes strong reason against their general adoption. They certainly cannot arrive at maturity as single trees, nor indeed in numbers so small as have been experimented upon on many occasions. They do not become bush headed; nor do they recoil from the wind, and continue to grow slowly, like oaks which are sometimes found to have adapted themselves to the situation in which they are placed, but they decay and die.

The leading shoot of a healthy young oak tree, of one year's growth, requires to be described, and it will at once be seen that the advice as to the necessity of shelter

deserves all the attention which we have endeavoured to attract to it. The one about to be described has not been selected for its great length, it being only forty-four inches long: whereas Forsyth mentions one six feet long.

It has no branches from it, but has fifty-eight leaves upon it, four of which are seven inches long and four wide; these are in the middle of the shoot; the rest of the leaves gradually decrease to half the size of the large ones: they have no tail like those of the trembling poplar, which allow the leaves to turn edgewise to let off the wind, therefore as it is received *upon* the leaves of oak trees, its full force is immediately conveyed to the stem. While such a shoot is growing, more than the upper half of it is unripe wood or vegetable, and is thickly set with leaves, consequently as pliant to the least force or pressure as the stem of corn or grass, and from this cause it cannot ascend, unless completely screened from the wind.

From the centre of this shoot, in the following year, another springs forth, and which, if equally sheltered, grows like the preceding one. The formation of a shoot appears to be a continued lengthening, increment, or unfolding from the top of it. They will produce a few branches below the joint, but the shoot will ascend in the same manner as the former one, covered also with leaves; but if these shoots are injured, they produce branches below the part affected, and the succeeding growth of the principal shoot or stem is proportionably less; sometimes only one is thrown out, but frequently more, so that in reality it has several leading shoots instead of one. As the leading shoot of one year is the stem of future years, it follows that the height and size of the stem of every tree depend on these shoots; it is therefore essential to arrange that they may be able to grow to their full extent and be perfectly matured.

According to Du Hamel, Dr. Hope, Sir J. E. Smith, and others, the increase of the

size of a tree is by a fluid or sap rising between the bark and the wood, and which first forms the inner silky bark or liber; these layers form into rings, tubes, or vessels, of which the whole vegetable body is an assemblage, and that the most vigorous trees sooner make the most perfect wood.—*Smith's Intro. Bot. p.* 33, 34, 36.

Therefore, if Messrs. Jesse and Withers are right in their statements of the rapid growth of oak trees in the period they give, it follows that a healthy tree would continue, if sufficiently protected, to increase at a compound rate in every part, at the same time; consequently, it is possible that it does not require much more than double the time the trees of the just named gentlemen had to grow in, to be as large as the Hatfield Bog and Selbourne oaks. It clearly appears that the silky bark is formed quite round each tree, and it is equally so that, however high they are, the sap ascends to the whole length of them every spring;

therefore the layers of new wood are formed all over the tree; hence it follows, that the larger the original shoot and the more vigorous it continues, the larger is the quantity of wood matured in a given time.

When the wind is strong, the leading shoots of those trees which are exposed to it, continue, perhaps for several days in succession, bending from a sixteenth to as much as half a circle; this impedes the circulation of the sap, injures the tubes and vessels of the shoots of the latest growth, and the stagnation of the fluids is the consequence: hence, the tree in reality becomes a mass of disease.

Matthews, it appears, from the foregoing, is entitled to no commendation for his plan of training plank timber; because he cannot, by merely cutting off a few side branches, force trees to grow upwards. Indeed, so ineffectual is this pruning, in almost every case where a branch is cut off a tree, that two or three

others shoot out, and there is nothing gained by it. As there is so formidable a host of advocates in its favor, they should show something in the shape of historical proofs of its utility: state, for instance, which of the giants of the forest was trained and trimmed by the ancient Britons:—this they will not attempt; they have no records, no traditions of so early a date. They may yet be forced to admit that it is introduced as a kind of help to the trees overgrown by the pines and others in the mixed plantations.

It is impossible to examine even this brief description of the manner in which the giants of the vegetable kingdom are formed, without admiring the wisdom and skill of the Almighty Creator of them, and feeling a deep reverential gratitude for His having combined so large a mass of matter, so indispensible to the use and comfort of mankind.

By advocating the principle that so large a number of trees should be planted upon an

acre of land, it perhaps may be supposed that no attention has been given to the doctrine of the use of leaves to the vegetable kingdom; the question has been considered, as far as it applies to the growth of timber. Where trees of only one kind are planted, each sends out an equal portion of branches and leaves, according to the space each tree has, and the stem grows at a less rate in proportion to the number of branches and leaves. The sap ascends the stem of a tree, and circulates to the extremity of the branches, to cause the leaves to grow, therefore it does not require the effect of the atmosphere upon the leaves to cause the fluids to ascend; this shows there is reason to conclude that a very large number of leaves is less necessary to the existence of trees than is maintained by some writers; they no doubt are necessary to keep the trees in health, and they will not exist without them. All that is contended for, is, that when a tree has many branches, consequently a superabundance of leaves, its sap is exhausted in their production,

and its growth of stem is proportionably less.

MAKING PLANTATIONS.

It might be thought that the object of this work was but half accomplished, if no attempt were made to state the most advantageous system of growing timber. The directions must of course be general, because there are so many different soils and situations in which a different arrangement might be necessary, to render it probable that a crop would grow to maturity. It should on every occasion be understood, before any tree is planted, what the average height is in its native regions, and whether it has the power to adapt itself to its new situation. There are many plantations of a mixture of the pine class, made upon the exposed peaks of hills; when the trees reach to forty or fifty feet high, they suddenly cease to grow higher, and throw out secondary leading shoots and large branches, which give the wind double

power over them; they then decay and are blown down, although the pines have not reached one third of their full size.

The loss to the owner is very considerable when this is the case; and, although of common occurrence, it has hitherto excited little, if any inquiry.

Suppose a plantation of one hundred acres was determined upon and left to my management, the first care would be to find out and report the best situation. If agreed upon, make a good fence of dry stone, paling, or quick, as the climate and situation admitted: destroy all the rabbits in and near it, and arrange for keeping them down. If many hares, dress the quick the first autumn or two with a composition of tar, soot, &c. to keep them from destroying it.

The hard, stoney, and rooted parts trench deep, and pick out the roots of nettles and large weeds; the level parts plough. Draw

a deep furrow with a common plough, then put a strong one into the furrow and go as deep with it as possible, the moulds of the second falling upon the sod of the first; or use the subsoil plough.

The youngest plants, from eighteen inches to two feet high, are preferable to any other; they are taken up from the nursery bed with less injury than larger ones; they are cheaper, and sooner recover transplanting when set out, from possessing all their roots, having a firmer hold of the earth, but few leaves upon them, and being not high enough to be shaken by the wind.

If the situation was exposed on the west side, it would certainly be advantageous to plant the first half dozen yards with trees which bear the wind better than oak, such as small leaved elm, beech, &c. varying them according to the soil and situation, and also their number. It would be an advantage to begin on this side, because, if so, the

outside trees would screen the inner ones. The trees should be set irregularly, and not in rows, as the leading shoots do not receive protection, the current of wind rushing along between the rows.

The oak plants should be at least seven thousand per acre; the thicker they are planted the sooner they recover transplanting. The four feet apart system requires two thousand seven hundred and twenty-two trees per acre; the three feet, four thousand eight hundred and forty trees, and the number recommended will be two thousand one hundred and sixty trees more than the last number; the shelter to be obtained by the greater number of plants must be obvious.

It is not to be supposed that the whole would be done in one season; continuing the planting of trees late in the spring must be condemned, because many failures have been witnessed from this cause.

The outside trees would probably require putting straight and treading round the roots, particularly if there had been any rough winds during the first spring and summer.

The number of trees per acre will perhaps be objected to, as wasteful and useless, but it must be remembered, the remains of the woods which have descended to the present generation have been subject to periodical thinnings for an indefinite period; in proof of which, most local histories of wood-land property furnish accounts of great falls of timber, at various periods; the young trees which grew amongst them were sheltered by the old ones, and formed a more complete screen for the leading shoots than so large an assemblage of them. It is to be remembered, that in the open and exposed parts of the wood-land there was a succession of thorns, hazel, &c. springing up, which completely protected the oak saplings.

CHAPTER VI.

EVIDENCE ON THE RATE OF GROWTH OF THE OAK.

Pontey, in page ninety-six, states that larch and oak flourish equally.

Matthews, in page forty, admits the rapid growth of oak timber after it has attained a certain size.

Withers, in his pamphlet on the cultivation of timber, states, that nearly two hundred

feet of solid timber were grown in eighty years.—*Matthews, p.* 200.

Jesse, in page one hundred and forty-six of the third volume of Gleanings in Natural History, states, that "an oak tree, planted in one thousand seven hundred and twenty, measured in one thousand seven hundred and ninety, at one foot from the ground, twelve feet six inches in circumference."

Hillyard, in page seventy-one of his Practical Farmer, states, that "some thus employed might live to enjoy the same gratifying feeling that Mr. Coke experienced about three years ago, when he, with Lady Ann and four of his sons, was on board a vessel, launched at Wells, which was built of oaks, produced from acorns of his own planting."

The trees described in page eighty-four are known by many old people, whose united testimony proves the age of them: they show the natural rate of growth imperfectly, as

they were set originally twenty-one feet apart, and so continue to this day. The largest is somewhat more sheltered than many of them, which fully accounts for its superiority of growth: if it had been closely surrounded by other trees, it no doubt would have been from sixty to seventy feet in height; the whole of the length of the stem is twenty feet, the girth eighteen inches, which is equal to forty-five feet of square timber; reckoning the same at three shillings and six pence per foot, with the addition of two shillings and six pence for top and bark, makes the tree worth eight pounds. It is clear, from an examination of these trees, that four hundred of them would grow to this size, at half the distance apart, seeing that there are as many squares of ten feet six inches each, per acre; thus their value would be three thousand two hundred pounds, in seventy-five years.

It is to be lamented that Mr. Jesse did not give full particulars of his tree, instead of so brief a description; as it unquestionably

is a full grown specimen. It must, however, be supposed to have had a long pine-like stem, from sixty to seventy feet high at least, perhaps something more, because the history of all the large oaks on record, shows a great length of stem, and that they tapered very gradually. Now the girth, at the base of the tree alluded to, is thirty-eight inches, therefore it would not, at the end of forty-five feet, be reduced to half, or nineteen inches: taking the dimensions at this rate, the girth, in the middle, is twenty-eight inches, which makes the contents two hundred and forty-five feet of solid timber, grown in seventy years; this exceeds Mr. Withers's tree.

Averaging the rate of growth of these two trees, their contents may be taken at two hundred feet each, say in eighty years.

Were the testimony of these two gentlemen wholly unsupported, still, as professional cultivators of timber, they would be entitled to some credit. Nevertheless, they clearly prove

that oak is not of so slow a growth as it has been generally considered. It is however desirable to have all the evidence that can be obtained on the point, and it is therefore natural to desire the testimony of "My Lord of Leicester," who, it appears, can give positive evidence as to the fact, but the wish is VAIN.

Enough, however, has been stated to show the importance of the proper management of this kind of property. Some large land-owners have two or three thousand acres of wood lands, game covers, &c. and perhaps more: it is, therefore, most material to them to know whether the trees in those woods and plantations which are reserved solely for the profits to be derived from the growth of timber, will, in the same period of time, be worth eight pounds or thirty-five pounds each: more particularly when it is remembered that the probability, if not the certainty, is, that to have trees of the latter value, the crop should be four times the number of the former, and that the larger is the natural size.

As the evidence is given as it is found, with references attached to it, the value is considerably enhanced.

Withers accounts for the rapid growth of his tree, but he appears to have let the truth escape by accident, without being fully aware of the cause of its rapid growth. "It stood in one of the sweetest sunny spots of the sweetest valley of our Highlands." He, however, attributes the rapid growth to the adjacent spring of water.

Mr. Jesse gives only the words before quoted, and no more; the omission of the inspector of parks and palaces, in not having drawn the obvious inferences from the tree he mentions, is very remarkable. These statements place him in a peculiar position, and particularly so when it is taken as a guide to the state of the plantations made under his directions. The former shows he thinks the oak a fast growing tree; the latter that his opinion is, it is a slow growing

one, as he has planted all kinds of trees around, to draw them up. But this is not all, for the old oak trees, growing on all sides of his plantations, prove that they grew unmixed with other trees.

The great advantage of having the best systems adopted by the office of woods and forests, would be, an immense revenue from the worst soils, and it would show to others what may be done most profitably, so that noblemen and landowners might have, by a reference to this department, the best and most correct advice; this would ensure a crop of good timber throughout the empire.

The honorable gentleman did not anticipate that his statements would ever be considered of the importance which is now attached to them, nor conceive they would be applied as weapons against himself, to prove his want of official ability. From the prominent post he occupies, the public have a right to expect that the plantations under

his care should show great skill and progress, as an example to all Her Majesty's subjects: oak timber being so indispensible in the British Isles. He has adopted all the untural systems pursued by private individuals. The honorable gentleman can have no excuse to offer, as the trees required to be grown are the weed of the soil which he has to plant: and even, if this was not the case, the quality of the soil is very superior to many places where large oak trees have been grown. Where there is an anxious desire to follow Nature's laws, there seldom is much difficulty in discovering them.

If a servant in a mercantile establishment showed similar remissness, most probably the principal would soon appoint some one in his place, with more penetration than to convict himself of wilful blindness, in the most important part of his duty.

It is not known how the officers graduate for appointments in this department, but

surely they should be compelled to produce something to testify their acquaintance with the details of the duties required of them. If inspectors and surveyors are necessary, it is equally essential that they should be well acquainted with the details of the business they have to superintend. Practical knowledge is considered necessary in every other department of the government, and why not in this? since the failure of the growing crop of timber proves it to be so much wanted. Billington, who appears to have been an inspector, or something of the kind, in Dean Forest, says, "they planted and replanted trees, persevering even to the fifth time, but all would not avail." Having seen failures from the mismanagement of private property where the land had been planted three times, it is but fair to assume it to be the case in Dean Forest. It is not to be wondered at, as Billington was a gardener: he might have been an adept at "*forcing* tender exotics," and yet entirely unacquainted with the nature of our native trees, as it

does not form part of the education of the profession.

It is cheerfully admitted that the proceedings of the Royal Society contain some very valuable papers on this subject. The practical men do not heed them; they require a rougher hand to point out their errors, and fearlessly to tell him who errs, "Thou art the man;" and should he dispute the point, let him call on that society to adjudge the question. Gentle admonition is of little avail with those old fashioned woodmen, and modern land agents, who now have the care of the property whence the navies of the last centuries were produced, or they would have had something more to show than short stems, bushy tops, and dead leading shoots. Sleeping over the paltry revenue that the periodical cuttings of the underwood afford, they appear to be unaware that the hazel, thorn, &c. are but the spontaneous nurses of the giants of the vegetable kingdom.

CHAPTER VII.

ON THE QUALITY OF DIFFERENT SPECIES OF OAK.

According to the most eminent botanical writers, the sessiliflora oak is propagated in the New Forest, and several other places mentioned by them, the timber of which they state to be very inferior * for ship building, and for other exposed or important purposes. It is cultivated on certain estates too, as is also the Turkish species—the timber of which is quite as inferior. The latter I have myself seen in two of the royal parks.

* Sir J. E. Smith's English Flora, vol. 4, p. 148—50.

They are easily discovered by the botanical descriptions: the latter species can be identified by the twigs and branches, and also by the roughness of the bark on the lower part of the stem, at any season of the year while the trees are young. There are statements that the different species of oak can be distinguished by the character, flash, or marks across the grain, when specimens are planed and polished: but individual trees of each species have more or less character, therefore there is no dependence to be placed on the quality of oak timber, unless it is examined by a competent person whilst it is standing.

The evidence before the committee of the House of Commons, on shipwrecks, gives a much less durability to foreign oak than to British timber; therefore it is likely to be of the inferior species of oak, as it abounds on the continent, especially in the German forests. A small part of Mr. Symonds's evidence ought to be known to all: "he has

heard of a ship, built at Dundee, of Stettin timber and Dantzic plank, rotting after three years; has known no such rapid decay in English timber; thinks the dry rot occurring in the latter is rather an exception than a rule."

The botanical writers alluded to, are, Ray, Martin, and Sir J. E. Smith, authorities not to be treated lightly, nor by any with impunity. An able writer in the Quarterly Review (No. 77, p. 22) advocates the claim of these authors to attention; yet the advice is unheeded, although the carpenters upon those estates where the sessiliflora and Turkish species are grown, are willing testimonies of the inferiority of the timber, and they fully corroborate this writer and the botanists: on one occasion it was stated, that "a piece of deal might as well be put into the ground, as it would last nearly as long." If a tree of either species is mixed with the British kind, in the construction of shipping, the former is likely to be decayed, while the

latter will remain quite sound; consequently, if a vessel thus constructed should get into difficulties in rough weather, the unsound timbers, by giving way, may occasion a frightful loss, both of life and property. Is the New Forest clear of these impostors to true value? The authorities there ought to state to parliament and the public the answer to this question.

"Sunderland is become the greatest ship building port in the world, there being at this time no less than ninety-eight large vessels building on the Weir."—*Cambridge Chronicle, 7th April,* 1838.

It was said by a reverend gentleman, who is well acquainted with the county of Durham, and to whom I read the above, that "it could not be from the superabundance of oak timber grown on the banks of the Weir, or near it." It is therefore natural to inquire whence the supply is obtained. A glance at the map of Europe shows the proximity of

the Baltic. If these ships are built of the sessiliflora oak, the use of such a material may be a saving to the builder, but it increases the necessity for the insurance of them, and a greater rate ought to be charged: but it is a question of considerable importance whether ships which have ceased to be seaworthy are not often insured for more than they are really worth, and then sent to sea, regardless of the lives of the crew: if this is not the case, shipowners are grossly belied. Surely there ought to be some penalty inflicted on those who cultivate the "IMPOSTORS" in these islands: at any rate they ought not to be found in the royal parks. By Lloyd's list it appears that in the year one thousand eight hundred and twenty-nine, six hundred and seventy-seven British ships were totally lost.

In proof of these statements the following is given:—

Extract of a report of a select committee appointed to inquire into the causes of the

increased number of shipwrecks. The sub-committee of Lloyd's addressed a letter to the Lords of the Admiralty, who consulted the officers of the principal dock yards, and returned the following answer, signed, "John Barrow."

"Department of the Surveyors of the Navy, Admiralty, 29th October, 1835.—In obedience to the directions contained in their lordships' order of the fifth of June last, to see if I could make any satisfactory report from the several yards, respecting the durability of oak timber, I beg to transmit, on the other side, an abstract statement of the said professional officers' opinions thereon, which their lordships will observe is very conflicting."

An abstract account of the officers of the yards' opinion on the durability of oak timber.

OAK TIMBER.	When used for floors and lower futtocks only.		When used for planking, above high water mark.	When used for the upper timbers.
	In midships.	Afore and abaft.		
English, ...	from 100 to 24 years average of 42 yards	from 20 to 12 years 15	from 20 to 12 years 16	from 30 to 15 years 16
Of the growth of the North of Europe,.....	from 30 to 9 years average of 18 yards	from 15 to 8 years 10	from 12 to 4 years 9	from 15 to 4 years 10
Of the growth of the British North American Colonies, generally known as Quebec white oak,..	from 30 to 5 years average of 17 yards	from 12 to 3 years 9	from 12 to 2 years 9	from 16 to 2 years 11

This fully justifies the writer of the Quarterly in the opinion he had formed;—"there is too much reason to believe that the numerous complaints that were heard about our ships being infested with what was called, improperly enough, the DRY ROT, were owing to the introduction of the sessiliflora species of oak into the naval dock yards, where, we understood, the distinction was not even suspected."—*Quarterly Review, No. 77, p. 22—3.*

It is a somewhat singular fact that the estate on which the largest sessiliflora oaks have been observed, is generally considered to be managed in the best manner, yet the timber is as thriftless as on many estates of less note, and the trees which produce timber of inferior quality (pines, white beech, &c.) bear a large proportion to the whole.

The United States' navy is built of the quercus virens, commonly called the live oak, but sometimes the hemispherical.—*See New York Times.*

It will, perhaps, be said, that if every owner of an estate grow oak timber, there will be a superabundance. It may be stated in answer, that almost every person is a consumer; that it is the best known timber for general purposes; and, that the continuance of the quantity of timber imported depends upon several contingencies, therefore liable at all times to interruptions; and these are most likely to happen when it may be the most needed; that is, in the event, or even the prospect of a war. It has been hinted, in a useful publication, that America may, at no very remote period, cease to be able to export timber to the extent it now does, at the present price, and that the "three hundred sail of shipping in the Saint Laurence" may be unable to complete their cargoes profitably; therefore, these considerations furnish some grounds for attaching much more importance to this subject, than it appears entitled to at the first glance; and they afford a fair presumption that the price of British oak timber will not depreciate.

CHAPTER VIII.

DEMAND FOR TIMBER.

The average duration of shipping has of course been ascertained, so that in a given time the whole of the royal and commercial navies* now in existence will cease to be sea worthy. The prospective demand for oak timber is therefore for this single purpose immense, and does not depend upon contingencies; or, if it do, the contingencies will be found much fewer than most of the

* In 1826, the latter consisted of twenty thousand four hundred and sixty-nine vessels, exclusive of those belonging to the Channel Islands and British plantations.

arrangements of mankind are subject to. England, if she value her own existence, must keep a watchful eye upon her shipping!

The amount of duty paid on the importation of foreign timber, for the year ending fifth of January, 1837, was one million, five hundred and thirty-seven thousand, four hundred and sixty-eight pounds. If this is upon an average twenty-five per cent. of the actual cost to the consumers, the sum of six million, one hundred and forty-nine thousand, eight hundred and seventy-two pounds, in that year, was drawn out of the pockets of the inhabitants of these islands for this article, and lost to the landowners. The actual per centage of the duty cannot be stated, because consumers living in or near seaports, buy of importers: timber consumed inland has additional charges for carriage, merchants' profits, &c. which reduce the per centage of the duty upon the cost of it. Taking the duty on oak and fir, from the colonies, at about eight per cent. and on that from the

Baltic at thirty-six per cent. to the consumers, it would probably be near the amount; the quantity from the colonies is about two-thirds of the whole. But the amount of duty alone, let the per centage of it to the consumers be what it may, proves an immense demand above the present home-grown supply, and is ample evidence that no extraneous importance is attached to the subject.

Various reports have been made to parliament of large tracts of waste land; indeed, some have gone so far as to state, "certain parts might be beneficially planted with trees." There are also extensive tracts of crown lands, which would grow "*the common British oak;*" and why should not a revenue be obtained by growing it, as well as by a duty on the importation of the sessiliflora and Turkish species, which, if used in the construction of ships of war of the largest class, is (according to Mr. Symonds's evidence) hardly worth the labor, therefore dear at the cost of the freight. Let the Admiralty look at the

report of its officers before the committee on shipwrecks. It ought to have demanded the attention of the commissioners of woods and forests to the subject, as it is of such vital importance to the royal navy; but it is in every way entitled to the attention of the House of Commons. A report has indeed been made that there are fifteen millions of acres of waste land in the united kingdom; if only one thirtieth part thereof was applied to the cultivation of timber, the produce, if all sold at the present price of timber, would eventually realize a sum exceeding the national debt. If five thousand acres were planted annually, for a century, at the end of that time there would be five hundred thousand acres. The cutting might then commence on those first planted. Taking only two hundred trees per acre, at ten pounds each, a revenue of ten million pounds per annum, for a century, would be obtained. It is clear that a large revenue might be derived from this source. The whole amount now drawn from the pockets of the consumers

of the immense quantity of foreign timber which is now imported, might be had as a direct revenue to Government, and the consumer would be benefited by the superiority of the article over that which they can obtain from any other part of the world.

Government is already a large grower of timber, and has a host of commissioners, surveyors, inspectors, keepers, &c. therefore it would be only to extend its plans and to make the service of these gentlemen USEFUL to the public. If it is the pleasure of landowners to buy and grow timber of bad quality, there is nothing to prevent their doing so, but Government is differently situated; it is bound to do the best for the community; and it appears to be the interest of the nation, that a supply of timber should be grown to render it in this respect independent of the Colonies and the owners of foreign soils.

One great advantage is, that the sinking fund system does not at the present rate of

interest accumulate capital at so great a rate as that of growing oak timber. The original deposit, namely, the expenses of planting, the rent as it accrues, the rates and taxes, and a trifling charge for superintendence, would amount, at the end of the term, to so small a sum, even at compound interest, that it would be scarcely entitled to attention. Every acre of waste land, therefore, under the control of Government, ought to be planted in the best manner, and on no pretence whatever should pines be planted in the neighbourhood of WINDSOR!!

There is a long list of forests, woods, parks, &c. the whole or parts of which are under the control of the commissioners of the office of woods and forests; therefore, if a proper method be practised, the period can be mentioned when Government will cease to be a purchaser of foreign timber. But few of these places are known to the author: of those that are, skill only is requisite to grow large quantities of good timber. Epping

Forest is one of the number, and if a part could be appropriated to the purpose, a valuable crop of oak could be grown; but the arrangements must be different from those on estates which limit it.

As the nation possesses tracts of waste land so extensive, it would most assuredly be safer to cultivate timber for sale, than to rely upon a revenue from the importation of foreign timber, which is at all times liable to a partial or even a total suspension.

With respect to sowing acorns, there is no doubt of its being done advantageously; but all such sowings require a vigilant and an acute superintendent. In the Transactions of the Royal Society, there are some valuable papers on this part of the subject, which were written by an illustrious and very clever lady.

It is important that timber should be grown upon the banks of all the great rivers, particularly the Thames, as the trifling charge

of carriage to the water, and merely floating it down the stream, would be nominal compared with the charges for carriage, &c. of that from Canada. The best price could be obtained in the London markets, and along the banks of the river, for all kinds of beams, planks, ship boat knees and crooks, fire wood, &c.

The value of timber in Evelyn's time has not been ascertained, but from the great quantity then growing and the limited consumption in comparison to that of the present day, it probably was much less than at this moment. Owners of large estates would do well to ask themselves whether they have one hundred thousand pounds or even thirty thousand pounds worth fit for sale, or a prospect of realizing such a sum at a given period. To heirs of estates, the judicious management of timber is of the greatest importance, as it is much more to their advantage to pay off incumbrances by the sale of it, than by mortgaging the land: indeed, a liberal provision

for the younger branches of families may be thus obtained, by a trifling deposit, without risk.

The actual importance of this subject cannot be thoroughly understood without the charges against it being stated, and the amount of the accumulation of the clear profit being fully shown; these are given in round numbers, but always so as to reduce the amount of the profit.

If the trees be not thinned, but allowed to overgrow each other, the underlings might decay and die, but this would be compensated by the increasing size and value of those that remain. They might not stand quite so regular as if thinned, but the rate of growth would probably exceed that of the trees in those plantations where there had been continual intermeddling: of course there will be no profit from the thinnings.

A statement of the comparative value of the growing crop of timber and underwood upon an acre of land, to that of clearing the same and replanting it with oak trees, at the end of 25 years.

The average annual growth of oak timber, under the present system, not more than 4 per cent. upon its value, at compound interest, which can be obtained by selling it, investing capital, &c.		
Rent produced by the growth of the underwood, with interest and compound interest thereon, for 25 years, at 4 per cent. deducting one-sixth for parochial rates, = £.7,	35	0
Parochial rates during the growth of oak poles, at compound interest,	7	0
To charge for replanting the land, at compound interest,	40	4
To sundry charges, &c.	3	7
To balance in favor of proposed plan, at the end of 25 years,	83	0
	£.168	11

To 25 years' interest and compound interest set against the growth of the existing crop,		
To the produce of the first thinning of 25 years' growth, to make the crop stand from 2ft. 6in. to 5ft. apart, cut 5000 poles, at 6 pence each, BARK and top included,	125	0
To the value of the remaining crop, 1742 poles, at 6 pence each, standing 5ft. apart,	43	11
	£.168	11

The rent of the old woods, in the foregoing calculation, is stated at twenty shillings per acre, as they are now paying that sum by the sale of the underwood, subject to the deductions for rates, &c. the land in many cases would not produce more rent if let for agricultural purposes. The waste land, which might now be planted, is not, with very few exceptions, worth so much, therefore it is a fair average.

The one-sixth of the rent, charged for parochial rates, land tax, &c. is nearly what it amounts to generally.

The charge for trenching the land, plants, and planting, is very high. Some land can be shown which was planted three times, by an ECONOMIC wood agent, without getting a crop to grow; land that is hard, rooted, and stony, will very often grow good timber, if it is properly managed. Nothing pays better for good management than timber.

Expenses of planting an acre.

	£.		
Trenching 160 rods, at 8d. per rod,	5	6	8
Seven thousand oak plants, at 25s. per 1000,	8	15	0
Planting same with great care, and looking over the plants the first two years, filling up vacancies, &c.	0	18	4
	£.15	0	0

All vegetable productions have their appointed time of maturity, but from the disparity of the circumference of oak trees of the same age, size cannot be taken as a guide to determine when they cease to increase in value; this depends on so many circumstances, that the appearance of the trees can alone be depended upon. The practice of thinning large trees being destructive to those which are allowed to remain, and as planting young trees amongst old ones cannot be the most economic method of growing timber, although it is practised * by the officers of the

* Between Windsor Park gate and Ascot race course.

woods and forest department, it follows that the most advantageous system is to clear and replant the land. There is a notion amongst those who have no practical knowledge, and among certain pretenders to it, that young trees will not grow well upon old woodlands: the examination of almost any land occupied by ancient trees will prove this to be erroneous.

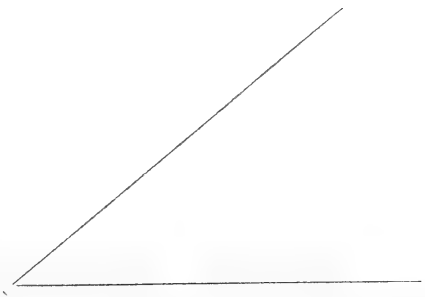
The losses owners submit to by allowing old trees to stand that have ceased to grow, is at least four fold; their decay, the interest and compound interest of the sum to be realized by the sale of them, and the growth of those which might be planted on the land; at the expiration of twenty years, the accumulation of property, by such arrangements, would be important. On every estate there should be a succession of timber, some planted and some of a marketable size, the quantity according to the size of the estate. Thus, the annual home consumption might be provided for, and the surplus sold. To establish this system with the least injury to the existing

crop, requires a perfect knowledge of the subject, and an examination of all the woods and plantations on the property; some to be cut down and the land applied to agricultural purposes, others to be enlarged; in others, fast growing trees to be planted, to shelter those which are to be kept in store. Experiments of various kinds have been observed, but, with one exception, they must be ranked as complete failures; indeed, so ill conceived were they, there could be no other result. In the successful instance, some good specimens of trees were observed growing on boggy soils, which had been "tapped" by the owner, according to a clever and effectual process: this gentleman is particularly skilful in draining land; his is practical knowledge, having farmed his own estate for more than thirty years.

If underwood be required, it will be more profitable to grow it unmixed with any kind of large trees, and each species by itself, as ash, hazel, oak thorns, &c.

A statement of the charges and value of the produce of 500 acres of land, planted with oak trees, at 2ft. 6in. apart, at the end of 25 years, leaving a crop to grow to maturity.

To 25 years' rent of 500 acres of land, at 10 shillings per acre, at 4 per cent. at compound interest, *	10,500	The produce of the first thinning of 25 years' growth, to make the crop stand from 2ft. 6in. to 5ft. apart, cut 5000 trees per acre, at 6 pence each, or 125 pounds per acre, leaving a crop of 1742 trees per acre, bark and top included,	62,500
To 25 years' parish rates, land tax, &c. at 5 shillings per acre, at compound interest, *	5,250		
To planting 500 acres with oak trees, at 15 pounds per acre, trenching, plants, and planting, included,	7,500		
To 25 years' compound interest on the above 7500 pounds, at 4 per cent.	12,600		
To cutting trees of the first thinning and sundry other charges,	650		
To net sum to be obtained by planting trees upon 500 acres, at the end of 25 years,	26,000		
	£.62,500		£.62,500



* The rent and rates to be considered about 15 shillings per acre. The object is not to show the amount of profit, but that no loss can occur from growing oak timber. A rent for most large plantations, as game preserves, might be obtained.

A statement showing the clear value of five hundred acres of oak trees after the first thinning, if left to grow to the average of forty-five feet per tree, or worth eight pounds each, which will be at the end of seventy-five years.

The produce of second thinning, at the end of 50 years, to make the crop stand from 5ft. to 10ft. apart, cut 1300 trees per acre, at 5 shillings each, bark and top included, leaving 400 trees per acre,	162,500
To produce of the crop standing 10 feet apart at the end of 75 years, 400 trees per acre, of 45ft. in each, at 3 shillings and 6 pence per foot, and 2 shillings and 6 pence each for top and bark, or £.8 each,	1,600,000
	£.1,762,500

The annual interest thereon, at four per cent. is seventy thousand five hundred pounds.

The opinion arising from a careful examination of all the evidence during this inquiry,

is, that oak trees will grow at a much greater rate according to this scale, than where fewer trees per acre are originally planted.

The question as to the average size of oak trees, at the end of seventy-five years, entirely rests upon the evidence in pages 107 and 8; there can be no doubt it is much more than forty-five feet.

One-fifth of Richmond Park (five hundred acres) is now covered with weeds, rushes, fern bushes, &c. the portion principally consists of obscure corners, which are in no way necessary to the scenery nor useful for grazing, but which would grow a good crop of valuable timber under good management. Those described in page 84, originally set at three feet apart, to be taken as a data.

The trees of 25 years' growth, set 3ft. apart, 4840 trees, or one tree on the centre of every square yard, cut 3600 per acre, or every other tree, at 6 pence each,	45,000
The trees of 50 years' growth (that of 45 years' growth, in Richmond Park, taken as the data, page 67) to make the crop stand from 6ft. to 12ft. cut every other tree, 900 per acre, at 5 shillings each, top and bark included,	112,500
The remaining crop of 302 trees per acre, at the end of 75 years (or before, see page 108) the tree in page 84 furnishing the data, at £.8 per tree, or £.2416 per acre,	1,208,000
	£.1,365,500

The main point of this question may be summed up in a very few words, namely, the space necessary for an oak tree to grow to maturity. It has been proved, that in the ancient forests in England, in the fir forests of the north of Europe, and in the back woods

of America, the trees grow close together; therefore, they occupy but few square feet each. At Windsor Castle and Hampton Court there are large orange trees, each of which occupies a box of a square yard of surface, and eighteen or twenty-four inches deep. The FEW INCHES of mould necessary for the rapid growth and flowering of the geraniums and other hot-house plants, are also inconsiderable to the quantity of wood, leaves, &c. they make; indeed, the quantity of vegetable food absorbed from the ground by a succession of good crops of wheat or other grain annually, far exceeds the quantity required to mature a crop of oak trees: it is certain, the largest trees require an increasing supply as long as they continue to thrive, but the trees they overgrow scarcely consume any. The deposit of dead leaves, &c. is commensurate, nay exceeds the quantity of vegetable food drawn from land by timber, so there is no instance of a crop dying from want of nourishment; but, on the contrary, the soil is improved by timber; therefore, it

proves that a less number of square feet of land is required for an oak tree to grow to maturity than managers of woods and plantations appear to think necessary.

Although the Government and the landowners generally, do not solicit advice on this subject, and some may perhaps receive it with ill grace, it is no less the duty of him who possesses information which may be valuable, to publish it for the general good. That it has been a source of wealth to have an estate covered with good timber cannot be denied; that it is essential to the existence of the empire is equally true; and, that it must be advantageous to it to be independent of foreign states, there can be little, if any doubt; at any rate, to possess it will be erring on the safe side. The quantity of manufactured goods sent in exchange for it is too trifling to be for a moment a matter of consideration.

Should a committee of the House of Commons proceed with an inquiry upon this

subject, no doubt evidence will be offered to prove that the rate of growth of oak trees is not exaggerated, therefore the profits of its cultivation are not exceeded in the foregoing calculations.

It is an extraordinary circumstance that an inquiry of this kind has not been made by the office of woods and forests, and published for the information of the public, as the most accurate statements of the age of growing oak trees could be produced by it. This humble attempt to supply the deficiency is given regardless of the contemptuous refusal of information from many private sources.

It is deeply lamented that better specimens of oak trees of a more advanced growth have not been obtained to ground further calculations upon: many others have been seen, but there is reason to suspect the accuracy of the statements of the age of many of them. Enough, however, is given to prove, beyond a doubt, that very large profits are

to be obtained by growing the common British oak.

The suggestions of the importance of this subject will perhaps cause landowners to ascertain the age of the fastest *growing* trees on their estates; these will corroborate the opinions here given.

There are very few estates which have not some proof of the suitableness of the soil for the growth of oak to perfection; some have been observed growing on blowing sands, which were remarkably healthy. Every seller of shipping appears by his advertisements to be glad to avail himself of the words "BUILT OF BRITISH OAK." A fashion has prevailed of collecting old oak furniture, the dates on much of it are carved; I am now sitting on a chair that once was part of the then modern furniture of Kirtling Hall; this was the residence of the Lord North who was one of the executors of Henry VIII. and who was visited by Queen Elizabeth, before she came to the

throne; this chair probably stood on the dais* at the time; it is as sound as on the day it was made; it is fastened together by pegs, and there is not a nail in it. Expensive modern furniture has been made of oak. Old buildings, in which oak forms a part, shows its durability for this purpose. The ancient boat, cut out of a solid piece, now deposited in the British Museum, and which had been imbedded in the earth for many centuries, proclaims the suitableness of the common British oak timber for every important purpose required by man. Heedless of these incontestible facts, presumptuous and avaricious men have been, and still are, searching for something NEW, to impose on a credulous public.

The nurseries and plantations on many estates contain so many kinds of trees which produce bad timber, one would almost fancy the persons who have the selections have no other desire than to find out and propagate

* See Ivanhoe, First Part of Vol. I,—The Hall of the Saxons.

the worst: they treat the produce of the acorn as contemptuously as if the timber was of questionable utility; appear to

"Ask of their mother earth, why oaks are made."

This is the result of their ignorance of the method by which it can be grown to perfection. In the beauty of its appearance it equals, if it does not surpass, all that has been hitherto introduced. Its nature is suited to the climate, as is its timber to the insular situation of this kingdom; in proof of which, it was provided for our ancestors in abundance, by an all-wise, kind, and bountiful Providence.

Thus, I have endeavoured to show how oak timber has been, and can be grown; the demand for it, and there is sufficient waste land to grow all the nation does or may require; and that the revenue may be increased by its growth. Let us then benefit ourselves by the means; resting assured that if Great Britain should be relieved from her

debt, it will be by availing ourselves of the assistance of the BOUNTIFUL CREATOR of all things—who, out of valueless matter, forms materials, which are to a virtuous and an industrious people more excellent than refined gold.

THE END.

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